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# USSR Report

ECONOMIC AFFAIRS

EKO: ECONOMICS AND ORGANIZATION OF  
INDUSTRIAL PRODUCTION



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11 October 1984

USSR REPORT  
ECONOMIC AFFAIRS

EKO: ECONOMICS AND ORGANIZATION OF INDUSTRIAL PRODUCTION

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## MANAGERS, SCIENTISTS DISCUSS LABOR DISCIPLINE

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian no 5, May 84 pp 3-4

[Introduction to following articles on labor discipline: "Economic Managers and Scientists Discuss Problems of Labor Discipline"]

[Text] Economic managers comprise one of the leading categories of our readers. In responding to articles in EKO, many of them have already expressed a desire to become familiar with the work experience of their colleagues not only through correspondence, on the pages of the magazine, but also through periodic meetings held in order to discuss crucial economic problems and advanced practical experience. Taking this suggestion into account, the Novosibirsk Oblast board of the scientific-economics society and the editorial staff of the magazine EKO have organized a directors' club. Its meetings will be held in Novosibirsk and at those enterprises of the country with whose work experience the managers would like to become familiar on the spot. It is suggested that when discussing problems the economic managers be joined by scientists and specialists of planning-economics, supply and financial agencies as well as by party and soviet workers.

The first meeting of the directors' club was devoted to problems of strengthening labor discipline. For discipline is a most important area, on which the success of the solutions to national economic problems largely depends.

At the June (1983) Plenum of the CPSU Central Committee it was said: "Improvement of organization and strengthening of labor discipline in all areas and at all levels -- from the worker and kolkhoz worker to the minister -- and strict observance of contractual commitments for deliveries of products, as the Central Committee demands -- this is a real reserve for advancing the economy. Taking advantage of it can produce and, as we see, does produce an appreciable material result without any special expenditures." It is from such broad perspectives that participants in the first meeting of the club -- representatives of scientific and production associations -- tried to view problems of strengthening labor discipline.

The organizers of the club invited as speakers scientists who are dealing with a complex of problems related to strengthening labor discipline, reducing labor turnover and improving the utilization of working time. Then the economic managers shared their observations, thoughts and practical experience.

The meeting was conducted by the magazine's editor-in-chief, the chairman of the Novosibirsk Oblast board of the scientific-economics society, Academician A. G. Aganbegyan, and the chairman of the Novosibirsk directors' club, the general director of the Ob' leather footwear association, Candidate of Economic Sciences S. M. Zverev.

We are publishing several abridged versions of the speeches of participants in the meeting.

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## IMPORTANCE OF COMPREHENSIVE APPROACH IN LABOR DISCIPLINE EMPHASIZED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 5-17

[Article by K. T. Dzhurabayev, doctor of economic sciences, chief of the department of economics and organization of industrial production of the Novosibirsk Electrical Equipment Institute: "A Comprehensive Approach Is Needed"]

[Text] Unwavering observance of discipline has not yet become a natural requirement of each worker. Again and again it is necessary to return to problems of strengthening labor discipline. What is the reason for this?

Undoubtedly, one can still see the timeliness of Lenin's tenet that "to construct new labor discipline ... is the work of many years and decades."<sup>1</sup> One cannot deny that one of the reasons for legal violations, including violations of labor discipline, under socialism is that remnants remain from the past in people's consciousness. But the majority of workers in the 1970's and 1980's were born and grew up under the conditions of a socialist state. Therefore reducing the problem to a matter of remnants does not produce a realistic picture.

Let us look at the problem from the standpoint of that unfinished business and those mistakes which, in our opinion, exist in the complex of measures for strengthening labor discipline.

### Look to the Root

In our opinion, there is no point in speaking about labor discipline without referring to a specific object. Discipline is a matter of following some fixed list of orders. They can pertain to the results of labor, to the technology or method of labor, or to its conditions. From this standpoint one can speak about precisely which kind of discipline is required from a specific worker when performing a specific job in a particular position or in a particular system of labor organization.

One of the main conditions for strengthening labor discipline is unwavering observance of labor legislation. The history of its development reflects all the vitally important stages in socialist construction. From the first

normative acts, from the first code of laws on labor adopted in 1918, there has been unchanging emphasis on the need for the strictest observance of discipline and intolerance of any violations of it. The sanctions have changed at various stages, but the principles have remained the same.

Thus the "clearest" violation, absenteeism, according to the December (1938) decree of the government, includes 20-minute violations of length of working time without a good excuse. When the Ukase of the Presidium of the USSR Supreme Soviet of 26 June 1940, "On the Changeover to the 8-Hour Work Day, the 7-Day Work Week and the Prohibition of Voluntary Departure of Workers and Employees from Enterprises and Institutions," went into effect, criminal liability was introduced for absenteeism. But as early as 1951 legislation refrained from judicial prosecution for absenteeism and returned to measures of disciplinary and social influence, having changed the very concept of absenteeism as the failure to appear at work for the entire work day without a good excuse.

The decree adopted in 1983 by the CPSU Central Committee, the USSR Council of Ministers and the AUCCTU concerning stepping up work for strengthening socialist labor discipline offers additional possibilities of fighting against violations of discipline. Workers and employees who are absent from work for more than 3 hours during the working day without a good excuse are subject to the same measures for liability which are established for absenteeism.

Unfortunately, many managers do not know labor legislation well. And, paradoxical as it may be, frequently the director, the head specialist or the manager of a service has no better an idea of labor legislation than the shop chiefs and foremen under his jurisdiction do. As Koz'ma Prutkov said, "look to the root": ignorance of the law means ignorance of the possibilities that are granted to the manager for improving labor discipline. Unskillful utilization of these and unintentional "violations" cause no less harm than deliberate violations do. And every deviation from legislation means both economic and social losses.

In 1972 we adopted the standard rules for internal distribution which embrace practically the entire complex of disciplinary relations. They can serve as a basis for creating the rules of each enterprise and association which conform to their concrete peculiarities. But frequently the rules are accepted formally, without taking these peculiarities into account.

Questions of labor discipline are touched upon in numerous local documents. And they lead to a situation where disciplinary norm setting becomes overgrown, it loses its compactness and flexibility, and it generates a large selection of means of influence as well as contradictions in their interpretation. In our opinion, it is necessary to publish a unified normative act concerning disciplinary relations which would not only systematize the system for holding people responsible which has taken form and proved itself in practice, but would also regulate the disciplinary interrelations between the administration and the worker.



Even a Candidate of Sciences Would Moan Over the Assignment ...

This is what a popular artist sings. But a doctor of sciences too will involuntarily scratch his head over what seems to be a simple problem: against "whom" or against "what" are we fighting? Against violators of labor discipline or against violations?

In recent years the main focus of the struggle for strengthening discipline in production has arbitrarily shifted to the violator. He is the active element, he is the one who deviates from the accepted behavior, and this means that it is he who receives most attention. But do we not then lose sight of the initial and main thing -- what causes the deviation, what is the primary reason for the violation?

A couple of years ago the opinion was widespread that it is mainly young workers who violate labor discipline, people who do not have much time in service and who have poor qualifications. The portrait of the modern violator is varied. In terms of age it is the entire range of ages when people are able to work. In terms of sex it is both male and female, although less in the latter. In terms of education it is right up to high scholarly degrees. Qualification and age characteristics are not a measure of the potential capability of violating labor discipline.

And what about the violations? Alas, the basic list has not changed, and remains just as it was many years ago: absences, showing up for work drunk, tardiness, and departure from work at their own volition. While varying in quantitative terms, they are almost stable in terms of their relation to one another. And, as a rule, it is precisely to these violations that attention is directed. As for violations in technology, they are generally covered by bonus "sanctions" -- they are not registered as disciplinary, and only the amounts of the bonuses are reduced. The forms of annual accounting do not provide for breaking down the losses of working time that are caused by various violations.

And violations grow in impact. An incorrect selection of indicators for material incentives gives rise to a desire for the sake of fulfilling the plan to "close one's eyes" to any violations, and organizational stoppages, idle time and irregularity of production disappear from the field of vision as soon as the plan is "made." Hence the illegal overtime work and the desire to call collectives in to work on their days off, and also rush work.

Thus during the period of 1975-1980 at enterprises of Novosibirsk and Tomsk that were investigated the amount of overtime work increased by 38 percent, and the amount of work on days off increased 2.5-fold. And this was when they had observed a tendency toward increased idle time and other losses of working time!

When production organization is not rhythmic, a situation is created in the collective whereby the people cease to value working time and become accustomed to regarding it as a useless waste. And any appeals for conscientious performance of their duty simply cannot be taken seriously under these circumstances.



According to calculations of economists, losses of working time as a result of violations of labor discipline amount to a large number of man-days in industry alone. But, according to expert estimates, losses from shortcomings in the organization of labor, and from partial shifts and entire days when the labor force and equipment are idle are even more significant.

But who is to blame for this? It is common practice to separate losses for which the workers are to blame from losses caused by organizational and technical factors. But organizational shortcomings are the direct consequence of a failure to observe discipline on the part of individual administrative staff workers, who are not always actually held responsible for their incomplete work, which gives rise to situations where the work positions are not supplied with blanks and instruments or the equipment is malfunctioning, and this comprises a large part of the idle time within the shift.

Organizational blunders mean not simply losses of working time, but also complicity in the tolerance of laxity and bad discipline. Moreover, according to data from research conducted among violators of labor discipline, every second violator receives material incentives and every fourth one receives moral incentives.

Labor organization involves dozens of interconnected aspects. And if we say that these interconnections are the responsibility of the personnel, then regardless of how severely we punish the violator, the violations will remain a daily occurrence.

#### The Active Do-Nothing

It was not so long ago that this phrase appeared in our vocabulary. Who is this, this "active do-nothing"? He arrives at work on time and goes home on time, having put in his time at work. It is difficult to find the results of his activity, but the wages keep coming and, incidentally, the bonuses too.

The universal qualities of working time make it possible to use it as a general measure of expenditures and effectiveness of labor. But in practice people have frequently come to forget that the most important characteristics of working time as an economic category are not only its duration, but also its intensiveness and the results from it.

While we are paying more attention to the observance of the boundaries of working time, we lose sight of the fact that within these boundaries it is necessary to work hard and with initiative. The results of the labor slip away from our attention, hidden behind the external signs of discipline, which also gives rise to imitation of activity. It is always possible to adapt to perfunctory discipline, regardless of how strict it may be, and to do nothing under the guise of being busy.

The inability to determine the contribution of each worker to the common cause and the lack of a clear idea of how many and in which section of the labor process it is necessary to have people so that their work will be busy and

effective, lead to an unjustified "inflation" of staffs, and generate do-nothings who live at the expensive of the collective.

What can be used to oppose this? Serious, well-thought-out and careful work for norm setting for labor, a clear-cut determination of the functions of the worker, the highest level of demandingness for the section of work entrusted to the worker, and supervision of the work not according to words and external indicators, but according to final results.

#### Not Numbers, But Ability!

In recent years it has become popular to speak about the chronic shortage of working hands. It has become so popular that any interruption of the production program, any shortcomings in the work of the managers, can be written off to this misfortune. And people have begun to think less and less frequently about what lies behind this and what measures the manager can take to eliminate the shortage of labor force. Predictions of demographers show that in the next few years we do not expect a substantial increase in the able-bodied population. This means that even now it is necessary to take an approach to the personnel problem which will not make the enterprises dependent on "numbers," but will stimulate "ability."

This means a primarily realistic, well considered combination of occupations and jobs everywhere. The experience of the Shchekino combine proves not with words, but in deeds that it is possible to work productively by combining work. In December 1981 the rights of the enterprises in the oblast to combine occupations (jobs) were essentially expanded. But the enterprises are in no hurry to take advantage of the rights that have been granted them. Why? Because they recall the difficulties encountered by the Shchekino workers. And although the enterprises are given a guarantee that the reduced number of workers resulting from combining occupations will not serve as a basis for changing the established limit on the numbers of personnel and the approved organization chart, for abolishing subdivisions and so forth, the doubts of the managers are justified. For the five-year plan, yes, but what about after it is over? Will the enterprise not be "transferred" into another group, so that its salaries will be reduced, its material incentive funds cut off, with less allotted for housing and so forth, and so on?

And the lists for combining engineering and technical personnel and employees are developed by the ministries and not the enterprises, as if the ministry staff had a better idea of the "hot" spots in the enterprise. (Is this not why the lists adopted by a number of ministries are so unviable?)

It is for these reasons that combining occupations is not becoming more widespread, and an important reserve is being lost. For it is precisely this that can bring about the realization of another poorly utilized possibility of eliminating the shortage of labor force. We are speaking about automation, mechanization and streamlining of production processes. The proportion of manual labor is great in industry, transportation, construction and the sphere of services. Thousands and thousands of working hands are being utilized with an extremely low efficiency factor. Declaring the need to mechanize labor processes does not mean the same as doing it in practice if we do not place

the worker in a situation where he himself will think of or insistently demand active mechanization, and this is possible primarily under the conditions of the combination of occupations.

An important reserve for overcoming the personnel shortage is intensive utilization of the forms of organization of labor with a partial work day or a partial work week. The fundamentals of labor legislation of the USSR and the Union Republics almost 15 years ago enabled us to take a new look at this reserve. The experience of the Baltic republics shows that by utilizing it one can enlist almost all of the able-bodied population into public production. Why are we so slow in adopting this experience?

Organization of labor with a partial work week or a partial day requires serious preparatory work. It is necessary to analyze where, to whom and in what sections of the production process this system can apply. It is even more difficult to create brigades with a partial day. The work is significant and difficult, but it is worthwhile if we wish to free ourselves of the notorious shortage of working hands.

Let us note that one factor which impedes the spreading of part-time work is a certain inconsistency in legislation. From Article 49 of the RSFSR Labor Code it follows that establishing these conditions is the business of the parties to the labor agreement, that is, the administration and the worker. And they determine the specific working conditions without any limitations, the main thing being that they satisfy both of the parties. The State Committee for Labor and Wages and the AUCCTU establish the provisions concerning the policy and the conditions for the use of the labor of women who have children and are working part time, while point 8 determines that "the length of the work day (shift), as a rule, should not be less than 4 hours and the work week -- no less than 20-24 hours, with a 5- and 6-day work week, respectively." Although later it mentions in passing the possibility of a different calculation, we all know very well what instructions are! And here is a deliberate impediment to our undertaking...

And the third area for overcoming the shortage of personnel is to reduce personnel turnover.

I Am Getting As Far Away From You As I Can!

So sang Kolobok. This little "song" can be heard in the personnel departments of our enterprises. A person leaves the enterprise. This is an alarming phenomenon. Of state significance. Labor turnover leads to irreplaceable losses. As a rule, the labor productivity of those who change jobs is typically lower during the last month at the old job and the first month at the new one. Changing from one enterprise to another takes more than a month.

The easiest thing is to say that it is the "rolling stones" who are leaving, in search of easy money. Alas, this is not always true. Sometimes far from the worst workers leave the enterprise.

If one analyzes the reasons for departure it turns out that two-thirds of those who leave are dissatisfied to one degree or another with the organization of labor at the enterprise. And when they give their dissatisfaction with their earnings as a reason, this too is frequently the result of organizational blunders. Only one-third of those who leave give as a reason the lack of prospects for improving their housing, the distance of the job from the place of residence, the lack of space in children's preschool institutions and family factors, that is, factors which it is difficult for the enterprise to eliminate single-handedly.

At one time great hopes were placed in public personnel departments. In places where they are a real force, the results are positive. Thus up to 10 percent of those who have submitted their resignations take them back after a conversation in the public personnel office. But the remaining 90 percent leave anyway. And is it really only external factors that cause them to do this? No! It is the lack of belief that anything can change for the better in this enterprise that makes them leave.

A new position has appeared at our enterprises -- labor discipline engineer. Possibly, with the appearance of such a worker changes for the better will take place. So far his functions are not defined well enough, and at many enterprises he has no rights, and he is made to do jobs which are far from the one intended for him. His task, obviously, is not simply to gather data and state facts, but to analyze carefully, and to contribute actively to the utilization of the entire set of means available to the enterprise, in the closest contact with the economic managers and the public agencies of the enterprises.

#### The Bonus -- Must Be Earned!

We have begun to forget that the bonus is an incentive. An incentive for good work and not for formal performance of that which a worker is obliged to do because of his position and because of his contractual commitments to the enterprise and the society as a whole. We are completely losing from our vocabulary the expression "he earned a bonus," and more and more frequently we hear: "he was deprived of his bonus." Awarding bonuses has ceased to be a factor which can effectively influence labor productivity.

What is the difference, say some executives: to earn a 50 percent bonus or to be deprived of 50 percent? But by saying this we are discrediting the very system of material incentives. We are developing in the worker an approach whereby he considers the bonus a mandatory condition, and any reduction of its amount is an impingement on his rights. He is also led to this assumption by the provision concerning bonuses which speaks precisely about depriving workers of bonuses.

Is it worthwhile to take away the bonus? It is necessary to take an approach which would show what material incentive the worker can receive, and would expose his misdeeds through disciplinary sanctions.



Now a number of violations are not registered under the disciplinary policy, but are "noted" so that when the results of the production period are summed up, the bonus of the violator can be decreased. In the first place, such an approach conceals the real number of violations of labor discipline. In the second place, the bonus is changed from an incentive into a punishment.

Yes, the amount of material remuneration is important. But what it was received for certainly does make a difference. And if the worker becomes accustomed to the idea that simple performance of his job duties gives him the right to a material incentive, one should not expect this incentive to become a factor in fighting to strengthen labor discipline.

The brigade form of labor organization has made it possible to change the situation for the better. The additional earnings and the bonuses (and at some enterprises, the entire sum of the earnings) are distributed with the help of the coefficient of labor participation. All this is labor participation and it should become the measure for material incentives for the worker.

Economic methods of strengthening discipline are becoming more and more widespread. But the incentives themselves are directed toward the fulfillment of planning indicators, and they do not sufficiently take the level of discipline into account. And only when the fulfillment of the plan is achieved at too high a price does attention turn to the basic task for eliminating difficulties and shortcomings -- strengthening labor and executive discipline at all levels, from the worker to the minister.

It has become clear that strengthening labor discipline exerts an influence not so much on the amount of material incentives as on the correct selection of those economic indicators on which incentives are based.

But economic incentives are not a panacea for all problems. They cannot be absolutized. In other words, it is necessary to take a differentiated approach to the selection of methods of influence. Thus moral penalties are effective only with a certain level of self-awareness, and otherwise they lose their significance. Is this not why we have come to consider it "old-fashioned" to turn to such measures as rebukes and reprimands?

Measures of social pressure are not at all widespread, although statistics speak in their favor: among those whose misdeeds were censured by the collective there were one-third fewer repeat violations than among violators who were punished by the administration alone. In collectives which extensively utilize measures of social pressure the level of labor discipline is usually higher, all other factors being equal. But, unfortunately, such forms of influence are applied, as a rule, in good collectives, where the numbers of violators and violations are relatively small.

The work experience with collective forms of labor organization show that with mutual motivation of all members of the brigade, not a single violation goes unnoticed, and it receives a serious collective evaluation. All this, of course, is in those cases where the brigade is not created formally, and the usefulness and expediency of the collective form is recognized.

With the USSR Law on Labor Collectives of 1983 in effect, the possibilities of lower production units to strengthen labor discipline have become more appreciable.

As we can see, the selection of means is fairly large. It is a matter of learning to determine in a specific situation what is most effective for the given case. In other words, we must learn not in words, but in deeds how to take advantage of these means.

#### Where Should Authority Be Used

Our economic managers are frequently like the cook in Krylov's fable. Far from all violations of labor discipline are reflected in the documents of the enterprise -- whether they be orders, minutes of meetings or materials from comrades' courts. There are not even explanatory notes for every occasion.

It is well known that every shop chief and foreman tries to show the management the best side of "his" shop or section. So when you show something unsightly people look at it, and the division manager himself is punished. For at some enterprises the bonus of the manager is decreased if one of his subordinates has ended up in the drunk tank on his free time. Under these conditions will every foreman or shop chief risk objectively reflecting the condition of labor discipline?

The manager of the subdivision is not only the organizer of the production process, but also the educator of his subordinates. He is fully responsible for every worker and for the collective as a whole. It is necessary to educate with example, deed, labor organization and his own adherence to principles.

But, after all, production means interrelations among adult individuals and not a primary school where it is necessary to explain "what is good and what is bad." A person comes to a labor collective with a certain amount of experience in life, understanding what he can and cannot do. This is a person who is capable of taking responsibility for his behavior.

If we demand of the manager real educational work, but do not punish him for any misdeed of his subordinates, the manager will not "hide" behind the violator. On the contrary, his position will become more active, and all paths of re-education, both with the help of the labor collective and under the disciplinary policy, will be more effective.

In an economic system all factors are interconnected and mutually conditioned, and therefore strengthening labor discipline is unthinkable without adjusting the traditional system of evaluations and indicators of any property.

The higher agency can assess the condition of labor discipline in two ways if it proceeds only from the number of officially registered violations: either as passivity on the part of the manager or as his principled approach to discipline violations.



But do the quantitative characteristics provide a realistic picture if one fails to consider the interconnected work that has actually been done by the manager in this area? By concentrating attention on quantitative factors alone, we automatically urge the manager toward a strategy of "good indicators," that is, in words he is in favor of strengthening labor discipline, and in deed he is covering up violations.

We have touched on only a couple of aspects which influence the condition of labor discipline. Not everything that has been said here is indisputable.

The polemic arises because decades of research on problems of strengthening labor discipline have not introduced any clarity into these issues, although we have devoted a good deal of attention to them: the researchers approach the problem, as a rule, from the positions of their sciences, whether they be economics, law, psychology and so forth. Hence the divergence in views and terminology, and even contradictory recommendations.

There is now a need to create a unified comprehensive program for strengthening labor discipline under the aegis of one of the leading scientific centers of the country, enlisting representatives from various scientific institutions, a program in which we would not only develop a unified approach to the fundamental concepts and a unified terminology, but also a unified methodological basis for the development of practical recommendations.

The goal of this program would be to give recommendations for determining the level of discipline in each individual section, and to teach the economic manager to register this level and influence it. The final result would be to create a situation in each enterprise whereby observance of labor discipline would become the recognized desire of every worker.

#### FOOTNOTE

1. Lenin, V. I., "Poln. sobr. soch." [Collected Works], Vol 40, p 316.

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## TENDENCIES INHERENT IN LABOR TURNOVER EXAMINED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 18-25

[Article by Z. V. Kupriyanova, candidate of economic sciences, Institute of Economics and Organization of Industrial Production of the USSR Academy of Sciences (Novosibirsk): "Labor Turnover: Breaking Undesirable Tendencies"]

[Text] Labor turnover as a statistical indicator is formed from two parts. One part is the coefficient that reflects the scale of the release of workers at their own request, and the other is the indicator of discharges because of violations of labor discipline. While in the former case they depend on the initiative of the workers themselves, in the latter case they depend on the initiative of the administration.

But why are two phenomena which appear so different at first glance lumped together under one indicator? The reason is that they have a common basis -- the absence of order, in the broad sense of the word, at the enterprise. Hence in places where production organization is high, people leave less frequently and there are also fewer violations of labor discipline. It is therefore no wonder that the task of reducing excess labor turnover is regarded in conjunction with problems of improving labor discipline in the decree of the CPSU Central Committee, the USSR Council of Ministers and the AUCCTU, "On Further Strengthening Labor Discipline and Reducing Personnel Turnover in the National Economy," which was adopted in 1979. In this decree the entire system of measures is oriented toward reducing the numbers of both kinds of discharges.

The unity of the basis also conditions the close connection between the scale of voluntary discharges of workers and discharges for violations of labor discipline. An analysis of data from many years shows that at enterprises which have frequent discharges at the request of the workers there are more discharges of violators of labor discipline and vice versa. Consequently, by influencing factors in labor turnover we are thus creating favorable conditions for improving labor discipline. Therefore a study of labor turnover and the creation of scientific fundamentals for controlling this process are directly related to problems of improving labor discipline.

## Motives for Discharges

In recent years labor turnover in industry has dropped significantly in all regions of the country. This was achieved as a result of measures taken by the party and government for retaining personnel, and also because of the improvement of the conditions for the labor and life of the workers resulting from the efforts of the enterprises themselves. But in Western Siberia the level of turnover remains appreciably higher than the average for the republic, and this ratio is typical of both parts of the indicator.

It has been noted that the level of turnover drops basically because of discharges at the workers' own requests, and the relative number of those discharged because of violations of labor discipline does not decrease. Thus at many Novosibirsk enterprises (the construction materials industry, timber and wood processing, ferrous metallurgy) this constituent part of turnover exceeds the average republic level 1.4-fold. It is precisely this that should become the object of our major concerns. But since the desire to leave the given place of work and violations of labor discipline have a common basis, it is clear that it is impossible to reduce turnover as a result of only one of these constituent parts.

With time the very factors that cause turnover undergo essential changes. The effects of some weaken, while others become stronger. In certain cases the same name conceals absolutely new content.

Our institute has conducted three comparable investigations of factors in personnel turnover in Novosibirsk industrial enterprises -- in 1964, 1970 and 1981. Various kinds of data were received, but the most informative were those which explain the reasons for discharges at the request of the workers (see table).

Let us consider the changes which have taken place in the structure of the motives in recent years.

Table. Dynamics of Motives for Discharges at the Request of Workers in Novosibirsk Industry, Percent of Those Questioned

Motives for Discharge	1964	1970	1981
Production	24.5	23.6	26.5
Including:			
Working conditions	4.9	5.9	7.0
Condition of health	4.6	3.9	6.2
Standard of living	34.6	31.5	38.8
Including:			
Wages	13.5	12.9	12.8
Housing	9.8	9.7	16.5
Personal	30.9	36.8	25.8
Other	5.4	4.2	2.7

Production factors. Labor turnover has increased because of dissatisfaction with working conditions. And this is also closely related to discharges because of poor health. These are essentially a single factor. Of course an increase in discharges because of these reasons does not mean deterioration of the working conditions at the industrial enterprises of Novosibirsk. Each year the city spends considerable amounts of money on reducing the physical heaviness, harmfulness and danger of the labor. Various kinds of benefits are also offered to people who work under unfavorable conditions. But the workers' attitude toward poor working conditions has changed and continues to change. What was considered tolerable a couple of years ago is now considered intolerable. The "value" of health itself has increased in the eyes of the workers, and for the sake of it they will frequently not change their place of work, in spite of the benefits that exist in many cases. Consequently, the problem of improving working conditions is now acquiring not only more significance, but also new content.

Factors in the standard of living. Labor turnover caused by these factors is increasing mainly as a result of dissatisfaction with the housing situation. The proportion accounted for by this motive has increased 1.7-fold as compared to 1970. For the first time it has become the main one and the one that is most widespread among all of the reasons for discharge. All this is taking place against a background of greater average provision of housing in the city. And the number of discharges was considerably greater in 1981 than it was in 1970.

It is obviously the case that during the past 10 years the demand for the amount of dwelling space -- the "social norm for housing" -- has increased, and at the same time there has been an increase in the demands for its quality and comfort. But the main thing is that a stable demand has been formed for independent, individual housing, and adult children no longer wish to live with their parents even when they have a good apartment of sufficient size. On the other hand, there is still not enough housing in the city. This problem is exacerbated by the lack of correspondence between the number of vacant jobs (and, consequently, the influx of migrants from other regions) and the development of the city's social infrastructure.

In 1970 we noted a reduction as compared to 1964 in the number of discharges motivated by a lack of space in children's institutions. In 1981 the proportion accounted for by this factor had sharply increased. This is explained by the fact that the waiting list for obtaining space in kindergartens and day nurseries is still long, the material base of children's institutions is still inadequate, and many of them require repair, renovation and modernization. There are not enough skilled medical and pedagogical personnel.

The proportion of those who are dissatisfied with their wages in the structure of reasons for discharge has practically not changed since 1964 and amounts to approximately 13 percent. For the most part this motive can be included among production factors, and then this largest group will amount to about 40 percent.



## Discharges: Pure Surpluses

A certain part of the turnover is rational and takes place in the interests of the worker and the society as a whole. But according to our calculations, approximately half of all the turnover today is undesirable. We have already discussed the fact that this is mainly discharges because of violations of labor discipline. This same category also includes discharges after which the worker returns to the enterprise some time later without having worked at all in the meantime.

These comprised 11.5 percent of the workers who were either discharged or newly hired at the enterprises we investigated. These discharges are the cost of poor organization of intraplant transfers. There are fairly frequent cases in which the worker who has not received permission to transfer to more attractive work within the plant, is discharged and returns to the same plant, but to the position he desires. This might not have happened with the proper regulation of intraplant movement of workers among shops, sections and occupations. In these cases workers frequently return to occupations which they had previously abandoned. A special investigation of interoccupational movement which we conducted at the Novosibirsk instrument plant showed that for every 100 cases in which occupations were changed within the plant, there were 29 cases in which people were returning to their old occupations. To some extent this movement contributes to increasing qualifications but a large part of it is known to be superfluous.

Especially serious concern is evoked by such a phenomenon as changing occupations when changing enterprises. Thus about 73 percent of the people who came to work at the enterprises we investigated (of those who had previously worked in the national economy) changed their occupations at the same time. In 1964 such workers comprised about 60 percent, and women change their occupations more frequently than men do. People who leave the construction materials, sewing and meat industries very frequently abandon their occupations. Approximately one-third of those who changed their occupations this way also dropped to a lower level of qualifications, and for 40 percent it remained the same. But the earnings increased for half of the workers in this group, although only 27 percent of those who left gave as the reason for their change a desire to increase their earnings.

The most widespread reason is the desire for more interesting and important work. This reason was given by 30 percent of those who changed their occupations. Every ninth person mentioned a desire to change working conditions.

Having gone to work at an enterprise, these workers are usually retrained. Thus within the city a rich occupational potential is created, which is not investigated and is thus nowhere taken into account, and which is utilized only to an insignificant degree. Of course, workers who have mastered several occupations can use them in their work. The accumulation of knowledge, abilities and skills turns these people into highly qualified specialists of a broad profile. But the majority of them do not find an outlet for their potential, especially in those cases where the change in occupation takes place simultaneously with a change in the sphere of application of their

labor. These processes worsen the shortage of workers in many occupations, which are especially characterized by an outflow of personnel. At the same time the system of occupational and vocational training is intensively preparing thousands of new workers, filling the gap that has formed as a result of changing occupations, and contributing only to a small degree to reducing the shortage of personnel.

It should be noted that planning agencies of the regions are not working on predicting the dynamics of the occupational-skill structure of the personnel. Therefore the activity of the system of vocational and technical education is not fully meeting the needs of the national economy.

#### Interruptions in Work

The amount of the losses sustained by the national economy from excessive turnover depends on two factors. These are the level of turnover (that is, the number of workers drawn out of the sphere of production into the sphere of redistribution) and the length of time these workers are outside the sphere of production. We have no unemployment and, moreover, there are always vacancies in all spheres and branches of the national economy. Consequently, finding a job amounts to selecting from many possibilities. As the shortage of labor force becomes more critical, the number of opportunities increases. Therefore one might expect that the amount of time spent in looking for work would decrease. It is generally recognized that the time we spend between jobs is steadily decreasing and amounts to approximately 20 days.

But in practice this is not the way it is.

As the investigation of Novosibirsk industrial enterprises in 1981 showed, the periods of time between leaving one job and finding another are becoming longer for people previously employed in the economy. Moreover, the average length of these interruptions exceeded the corresponding indicator for 1970 1.4-fold. When calculating the average amount of the indicator we took into account only those workers whose time between jobs did not exceed 180 days, considering a longer amount of time to be a temporary leave from work in public production. In this case the average amount of time for workers in Novosibirsk industry was 40 days. But if we were to include all those who were investigated, including those with an interruption of more than 180 days, the average number increases to 53 days.

The main means of reducing this time interval is usually called the employment service in cities. But this problem is much more complicated than it seems at first glance. According to data from our research, the time the worker spends in settling into a new job is practically not changing with the years, and amounts to approximately 14 days. More than half of the people coming to Novosibirsk industrial enterprises during the period of the investigation had an interruption in work of less than a month. It was caused mainly by the sorting out and evaluation of the variants of work and the procedure of assuming the job itself. Here a good deal could be achieved by improving the work of the labor placement service.



The rest of the people who changed their place of work were all different. They had longer interruptions in their working time. They were caused mainly by moving to Novosibirsk from other population points, filling out passes to come into the city, difficulties in finding places for children in children's institutions, the condition of their health, and so forth.

Interruptions in work caused by illness and family circumstances have increased significantly. There has been an increase in the average amount of time without work because of the lack of accommodations in children's institutions. The interruption in work of workers under labor agreements has increased 3-fold on the average. Every seventh person coming to the enterprise had not worked for 2 months, justifying this by material support.

The interruption was one-third of the average for those who came to production after completing a training institution or being transferred from another enterprise. A it was the greatest for those who came through organized recruitment or were sent by commissions of ispolkoms, exceeding the average 2.5 to 3-fold.

Strange as it may be, for workers who have taken advantage of the services of the labor placement bureaus before being hired, the time without work was more than 2 months. This shows once again the ambiguous role of the service. It is obvious that the most ideal work does not guarantee a reduction of the time periods between jobs, since a worker who has received information about a job or has even been sent to one can fail to take advantage of the opportunity or continue his independent search for more suitable conditions, or else take his time, allowing himself an additional vacation. This means that along with improving the work of the employment agencies, it is necessary to provide incentive for reducing the time periods between jobs.

Thus during the past 10 years certain unfavorable tendencies have been observed in the processes of redistribution of labor force. One could suggest that the decree of the CPSU Central Committee, the USSR Council of Ministers and the AUCCTU, "On Further Strengthening of Labor Discipline and Reduction of Personnel Turnover in the National Economy," and the introduction of a 20-percent addition to the pension for continuous service are weakening these unfavorable tendencies somewhat. But it is clear that the ways and means of reducing the time periods between jobs are diverse, just as their causes are. Because they are new, many of the phenomena have not been interpreted yet. The data from our investigation make it possible to draw the attention of practical workers and researchers to these problems.

#### Possible Solutions

Many of the aforementioned problems can be solved through the efforts of the enterprises themselves. But some of them must be considered at higher levels of management. In recent years in party documents, government decisions and scientific literature there has been much discussion of stepping up control over economic processes at the territorial level in addition to the branch level. Individual actions of the enterprises are inadequate to create production and living conditions which would slow up labor turnover and act as an obstacle to violations of labor discipline. The "social capacity" of the

cities, that is, the ability of their social infrastructure to satisfy the needs of the residents for housing, medical aid, transportation, trade services and so forth, should correspond to their "economic capacity" (the ability of the cities to offer the population jobs of various kinds).<sup>1</sup> This requires that the efforts of individual enterprises be included in a system of measures that is planned at the regional level and designed to serve unified goals. As an intermediate stage, it is possible to consolidate the forces of the enterprises in groups that are joined together according to their branches.

This approach to solving economic and social problems is especially important for small enterprises. As compared to large ones, they have less opportunity to improve production and solve social problems, and therefore they have higher indicators of labor turnover and violations of labor discipline. As long as these enterprises are organizationally separate and their resources are dispersed it would be difficult to expect any large qualitative changes in their socio-economic development. The unification of the forces of small enterprises into some organizational framework (following the experience of Berdyansk, for example) would essentially improve the situation.

Another way of creating normal conditions for labor and life in the various regions is to change over to regulation of the activity of the enterprises within the framework of regional programs. The most widespread now are programs for releasing workers from heavy and harmful manual labor. But, as our research shows, there is still a good deal of formalism here. These summary documents do not guarantee a unification and cooperation of the forces of the enterprises of various branches, and sometimes even of one branch. They do not always specify the methods of solving problems, they do not determine the resource portion, and they do not stipulate clearly the responsibility for carrying out assignments. In essence, these programs still do not go beyond the framework of a certain kind of coordination work of various enterprises and organizations.

Who should be in charge of the work on programs at a regional level? The labor divisions of the oblast ispolkoms do not have the authority for this, and therefore they do not handle personnel. Up to this point, all programs that we have managed to carry out successfully have been headed by party agencies and have been developed by scientific research organizations. This path is typical of the first stage of the application of the target-program principle of management of the national economy. Obviously, the transformation of the programs into a method of planning can take place only through transferring the functions of drawing up programs and supervising their implementation to the planning commissions of the regions.

#### FOOTNOTE

1. The term "economic capacity" was suggested by V. I. Perevedentsev in the book "Metody izucheniya migratsii naseleniya" [Methods of Studying Migration of the Population], Moscow, "Nauka", 1975, p 103; the term "social capacity" has been used by T. I. Zaslavskaya and L. V. Korel' (IE10PP SO AN SSSR).

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## CHANNELS FOR LOSSES OF WORKING TIME ANALYZED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 26-33

[Article by Z. I. Kalugina, candidate of economic sciences, Institute of Economics and Organization of Industrial Production of the Siberian Branch of the USSR Academy of Sciences: "An Anatomy of Losses of Working Time"]

[Text] The utilization of working time is an integral indicator which reflects the level of organization of labor and production and the condition of labor discipline both at individual enterprises and within a particular territorial unit. It is now being used to evaluate the utilization of personnel in industry, construction, transportation and other branches of the national economy which have statistical accounting of working time. Statistical data are augmented by materials from selective investigations.

But such information is inadequate for evaluating the labor resource situation for some territory as a whole -- a city, for example. There is no statistical accountability for the utilization of working time in trade, public catering or at consumer service enterprises. And yet these spheres are taking away increasingly large amounts of labor resources. Not only the quantity, but also the quality of services rendered to the population depend on how they are utilized.

Therefore it is expedient to use labor balances (working time) for evaluation. Their main task is to reflect more completely and precisely the labor resources, the sources of their formation, the proportions of their distribution and the degree of their utilization in public production, as differentiated according to the spheres of production and the branches of the national economy.

The balance of a city's labor is not the mechanical sum of the balances of time at enterprises. Embracing a large scale, it shows that which cannot be accounted for in terms of individual enterprises. For example, it shows losses from labor turnover and migration of the population and from the inadequate enlistment of pensioners, pupils, students and housewives in part-time work and seasonal or temporary work.



The balances of working time can be drawn up by the city labor agencies on the basis of the balance of labor resources, data from statistical accounting concerning the utilization of work time by workers in industry, construction and transportation, and also from materials for a selective study of the utilization of work time in other branches of the national economy, including the nonindustrial sphere. It would be expedient to establish a list of the corresponding statistical and planning indicators, and also data from local accounting, time-and-motion studies and self-time-and-motion studies which are sent to the labor agencies.

The balance of work time, which embraces all branches of the national economy and all categories of workers, reflects the total losses of work time which are sustained by the public production of the city as a result of under-utilization of labor resources. Reduction of losses is one of the indicators of the economic effectiveness of measures for improving the utilization of labor resources which have been developed both for individual enterprises and for the city as a whole.

Development and analysis of the actual balances of working time make it possible to calculate the total losses, including those that are citywide, to determine the factors that cause under-utilization of the supply of working time, and to find ways of eliminating or reducing them.

The research we conducted in the city of Rubtsovsk in Altay Kray in 1970-1980 enabled us to calculate the city's balance of working time. We selected 75 enterprises in material production and the nonindustrial sphere with a total of 12,500 employees, which amounted to 16 percent of the overall number of workers. Additionally, we used statistical material concerning the utilization of work time in industry, construction and transportation and data from time-and-motion studies of the work day. The working time was calculated each month throughout the course of the year and was differentiated according to the category and sex of the worker.

An analysis of the balance for 1972 showed the main reasons for the incomplete utilization of working time in public production: intra-urban labor turnover and migration of the population, and entire-day and intra-shift losses of working time. The analysis was repeated in 1980 (see Table 1).

As compared to 1972, the coefficient of labor turnover decreased from 20 to 16 percent, although in certain branches it remained fairly high, in construction -- 20.2 percent, transportation -- 25.4 percent, and consumer services -- 26.1 percent. The lack of a unified center for the distribution of labor force made it impossible to reduce the amount of time required for changing from one job to another within the city. Moreover, in Rubtsovsk, as in other cities of Altay Kray and Novosibirsk Oblast, the amount of time lost when changing from one job to another is increasing. In the opinion of specialists, this is caused by the higher standard of living of the population (there is no material incentive to begin the new job as quickly as possible) and the existence in Siberian cities of a significant number of vacant work positions.

According to data from the sector for social problems in industry and construction of the IEiOPP, in 1972 in Rubtsovsk 25.3 days were lost when changing from one enterprise to another, and 33.1 days were lost when changing residences, while in 1978 these figures were 34.8 and 50.5 days, respectively. During 1972-1980 there was an increased outflow of able-bodied population from the city. As a result, there was also a significant increase in losses of working time. While in 1972 3.5 million man-hours were not utilized in public production because of these reasons, in 1982 this figure was 4.5 million.

Table 1. Balance of Work Time of Rubtsovsk Workers in 1972 and 1980, Percent of Normative Supply

	1972	1980
Normative supply of time of people employed full-time in production*	100.0	100.0
Additional resources of work time	1.80	2.16
Including:		
Time of workers who combine occupations	0.94	1.32
Time of part-time workers	0.03	0.03
Overtime work	0.83	0.81
City's potential supply of work time	101.8	102.2
Unutilized work time	22.1	26.7
Including:		
Losses of work time because of turnover	2.1	2.4
Entire-day absences from work	11.2	10.9
Intra-shift losses and entire days of down time	8.8	13.4**
Supply of time used in the city's public production	79.7	75.5

\*Regulated reduction of working time taken into account when calculating the normed supply of working time.

\*\*According to estimates of workers.

In order for workers in material production to utilize the calendar supply of work time, it is typical to have a certain increase in the amount of time worked, primarily as a result of reducing entire-day absences. But the structure of the latter, in our opinion, has become less rational. There has been a reduction of the number of training and regular leaves, and also maternity leaves, that is, those expenditures of working time which contribute to the normal reinforcement of the labor force. There has been an increased number of absences because of illness and other kinds of absence which are permitted by the law. A positive phenomenon is the reduction of the number of absences and failures to show up at work with the permission of the administration.

In the nonindustrial sphere, the number of failures to appear at work has decreased mainly as a result of more complete utilization of regular vacations and an increased illness rate, which is typical of practically all branches in the city.



At the same time, significant positive changes have taken place in the medical service for the citizens: there are almost twice as many physicians, the number of hospital beds has increased, and so forth. Apparently the increased number of absences because of illness is related to the conditions for labor and life in the city. In the opinion of specialists, this causes at least 25-30 percent of the temporary work disabilities.

The level and the nature of the illnesses is also influenced by the demographic composition of the workers, the standard of living, the condition of the environment, the development of public health, and so forth.

In the city as a whole, the utilization of the entire-day supply of working time has not essentially changed (see Table 2).

A reduction of entire-day absences by 1-2 days per worker would be tantamount to increasing the entire supply of work time by 108,000 man-days, which corresponds to an annual supply of work time of 500 workers. But because of the fact that in 1980 the number of people employed in public production increased by 13 percent, the absolute amount of unutilized work time because of absences has not decreased, but has increased by 2.2 million man-hours a year, although the proportion of losses of this kind has dropped by 0.2 percentage points since 1972.

Table 2. Dynamics of the Utilization of Work Time in Public Production in Rubtsovsk in 1972-1980, Days per Year per Worker

Structure of absences from work	1972	1980
Days worked	231.2	234.4
Entire-day down time, man-days	0.2	0.2
Absences from work, total days	34.2	33.0
Including:		
Regular vacations	17.0	16.6
Training leaves	1.5	1.4
Maternity leaves	3.1	2.1
Illness	8.9	9.5
Other absences permitted by law	2.3	2.3
With permission of administration	0.9	0.9
Truancy	0.5	0.5
Holidays and days off	100.4	98.4

Calculations and analysis of the information that was gathered made it possible to draw the following conclusions.

The main factors that determine the degree of utilization of the supply of working time are the level of organization and the conditions for labor, the condition of labor discipline, the structure of personnel according to sex, age and family situation and educational level, and the system of benefits offered to individual categories of workers (people taking training without leave from production, adolescents, people employed in harmful working conditions, single mothers and others).

The city has real possibilities of reducing entire-day losses of working time, primarily as a result of reducing the illness rate of workers, and reducing unexcused absences and administrative leaves. The implementation of the measures envisioned by the decrees of the CPSU Central Committee, the USSR Council of Ministers and the AUCCTU, "On Stepping Up Work for Strengthening Socialist Labor Discipline" and "On Additional Measures for Strengthening Labor Discipline," will contribute to this.

But the main reserve for increasing the total supply of working time in the city is the reduction of intra-shift losses and entire-day down time. Yet there is practically no reliable accounting for the utilization of intra-shift working time. Thus at industrial enterprises of Rubtsovsk, according to statistical data, their amount does not exceed one-tenth of a percent, according to data of time-and-motion studies of the working day -- 7-8 percent,<sup>2</sup> and according to the estimates of the workers themselves -- 15-16 percent.<sup>3</sup> Moreover, the amounts of intra-shift losses are almost the same for enterprises in the sphere of material production (15.4 percent) and in the nonindustrial sphere (15.1 percent). Specialists have repeatedly pointed out the shortcomings in the accounting for working time. In this connection, it seems that it is time to take measures for increasing the responsibility of the managers for the organization of reliable accounting, which was envisioned by the aforementioned decree, "On Stepping Up Work for Strengthening Socialist Labor Discipline."

Failing to take advantage of 15 percent of the total available working time in the city is tantamount to having 13,000 workers not work for a year, which exceeds the number of people employed in such branches as trade, public catering, consumer services and communications taken together.

The main reasons for losses of working time are down time of equipment because of unsatisfactory repair and adjustment, the existence of outdated equipment and instruments,<sup>4</sup> unsatisfactory material and technical support, a low level of organization of labor, production and management, and irregularity in the work of individual production units.

The list makes it possible to speak of the fact that some of the intra-shift losses can be essentially reduced after renovation and technical re-equipment of a number of productions. Other losses can be eliminated by the enterprises themselves and do not require large capital investments.

The total amount of unutilized working time amounts to more than 51 million man-hours a year. A reduction of these losses if only by half would be tantamount to recruiting more than 13,000 people for public production.

In order to put internal reserves to work, it is necessary to increase the economic motivation of individual enterprises and the city as a whole to economize on live labor and keep better track of its utilization. To this end it would be expedient to include indicators of the utilization of working time among the basic indicators or among those which are taken into account when the results of socialist competition are summed up. The level of utilization of working time should be included in the calculation of the limits on the

numbers of workers and employees, and should be taken into account when coordinating the plans for increasing the additional demand for labor force. There is now a need to create a unified automated system for accounting for the utilization of working time which includes all branches of the city economy and all categories of workers.<sup>5</sup> What with the smaller increase in labor resources and the greater outflow of able-bodied population from the city, it is necessary to enlist additional resources of working time. These include combining occupations, part-time work, seasonal work and temporary employment. These are formed from the supply of time of people who already have employment (school children, students, housewives) and people beyond working age or who are partially disabled.

An analysis of the balances of the city's working time during 1972-1980 showed that this source of increasing the total supply of working time is now being utilized to a considerably greater degree (see Table 3).

Additional sources of working time had increased in 1980 as compared to 1972 by 1,140,800 man-hours. They also comprise a larger proportion of the total supply of working time. This has taken place mainly because combining occupations has become more widespread, especially in the nonindustrial sphere. According to data from our investigation, the proportions of combination of occupations in 1980 amounted to: in education 11.2 percent of the average registered number of workers, in scientific institutions of the city -- 7.5 percent, in public health -- 6.7 percent, in housing and municipal services and consumer services -- 6.3 percent, and in cultural institutions -- 22.4 percent. The supply of time of people who combine occupations increased by 8.7 percent during the period under investigation.

Table 3. Structure of Additional Resources of Working Time in Public Production of Rubtsovsk in 1972 and 1980

Resources	1972		1980	
	Thousands	Percent	Thousands	Percent
	of manhours	of total	of manhours	of total
Overtime work	1391.9	46.2	1563.9	37.7
Time supply of people who combine occupations	1571.9	52.2	2529.7	60.9
Time supply of people with part-time work	46.5	1.6	57.5	1.4
TOTAL	3010.3	100.0	4151.1	100.0

As for part-time work, it has not become sufficiently widespread at enterprises, although there are significant possibilities of this in the city. The amount of overtime work per worker remained at the previous level, and its proportion in the additional resources decreased. In the future, enlistment of these resources should proceed mainly through recruiting student youth, pensioners and housewives to work partial days or partial weeks. Enlisting

additional resources of working time has made it possible to increase the total supply of working time by more than 2 percent.

On the whole, the city's total supply of working time is utilized by 75.5 percent, that is, approximately every fourth worker has been excluded from public production during the course of a year. Naturally, this aggravates the situation with labor resources.

The stable nature and significant scale of incomplete utilization of working time show the inadequate motivation of the enterprises and institutions to economize on labor force, and of each worker to work more efficiently.

A reliable accounting for working time which embraces all branches of the national economy provides sufficiently complete information about the utilization of labor resources in public production and makes it possible to develop and analyze labor balances. Having studied the reasons for the incomplete utilization of labor resources, one can develop concrete measures directed toward their efficient utilization. The reduction in the growth of an able-bodied population is increasing the strain on the balance of the labor force, which also makes it necessary to reveal and account for reserves of working time. In this connection, a calculation of the predicted balances of working time will make it possible to estimate more precisely the prospects for internal reserves as well.

#### FOOTNOTES

1. The principle of construction and the main areas of analysis of the balance of working time for the city are presented in the book: Artemov, V. A., Balykova, N. A., Kalugina, Z. I., "Vremya naseleniya goroda: planirovaniye i ispol'zovaniye" [The Time of Populating a City: Planning and Utilization], Novosibirsk, "Nauka", 1982, pp 54-126.
2. Molchanov, V. A., Pershin, P. M., "Problems of Management of Working Time at Enterprises and in the City" in the book: "Primeneniye pokazateley vremeni v sotsial'no-ekonomicheskom planirovanii goroda i sela" [Application of Time Indicators in Socio-Economic Planning of Cities and Villages], Novosibirsk, 1981, pp 134-138.
3. In 1980 we questioned 2,291 workers from various branches of the national economy.
4. In the opinion of the workers, more than one-third of the losses of working time in the city's industry are because of this.
5. See: "Primeneniye pokazateley vremeni v sotsial'no-ekonomicheskom planirovanii goroda i sela," Novosibirsk, 1981, pp 130-138.

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## LABOR PROCESSES VIEWED AS SINGLE, UNIFIED PHENOMENON

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 34-37

[Condensed speech of V. A. Aranovskiy, instrument plant director, by EKO correspondents Ye. Lysaya and L. Shcherbakova under the rubric "Directors' Club": "General Order and Discipline -- Links of the Same Chain"]

[Text] I consider it impossible to achieve high labor discipline at an enterprise which does not have general order. What do I have in mind?

Above all, this means rhythmic work. At our plant, for example, because of this alone, in 1982-1983 unexcused absences and losses of working time decreased by 12 percent. And this is quite understandable. A person goes to the job which is already waiting for him, and the foreman does not say to him: "Take a hike for an hour or two -- we have no batching items." And then there is dinner, and a person does not want to work after dinner ...

But rhythmic operation of an enterprise depends largely on supplies. Supply discipline is perhaps the most burning problem for any production worker. If the metal and batching items have been received on time one can be stricter with the worker. In my opinion, losses of working time can be cut in half if the work of the supply organizations is efficiently arranged. A good deal has been said about this recently, but so far it is not clear that the territorial agencies of Gosstab have rearranged their work. They should guarantee to supply us with everything, but this is not the way it is in practice.

I wish to give one example. In 1982 the Serovo plant did not deliver any metal for a half year. And they always gave the same response to all of our inquiries and visits: "We have not delivered it, and we do not intend to." But it is impossible to make drill holders without calibrated steel (our plant is the only place in the country where they are produced). There could be 600 people out of work! Both correspondents and procurators have come to the enterprise, but nothing has happened. In order to give the workers something to do it was necessary to use steel of other profiles and brands, just so long as the people did not stand around idle. Labor-intensiveness increased: in order to process this metal on our automatic machines it had to be calibrated beforehand. Production outlays increased. And were sanctions that satisfied us taken against the Serovo plant? No! The procurator of the city of Serovo

answered us thus: "The plant is failing to deliver metal not only to you, but also to other enterprises, because of the shortage of labor force, and therefore we cannot give a positive solution to this question."

Seasonal labor turnover also impedes the rhythmic work of the enterprise. Our plant is located next to a so-called private sector. And even in the winter I can name the people who will abandon their jobs in the summer and sell vegetables from their private gardens at the bazaar. The plant has about 200 people like this. Having abandoned production for the summer, when there is an especially large number of opportunities to work within the city and in the oblast, and having earned more money for these 3-4 months, they return and beg to be taken back. In my opinion, we do not have effective enough levers for economic influence on these people.

And what measures are we taking to strengthen discipline and reduce turnover? We are devoting a great deal of attention to the creation at the enterprise of a microclimate whereby a person thinks before violating labor discipline. Our main task in this connection is to maintain order at all levels, from top to bottom. We began with management. If the plant managers have initiative, they will perform their duties efficiently and promptly, and they will not be afraid of responsibility. Then they will be able to demand a great deal of the workers. Discipline at the plant begins with us.

Each month we hold a "Day of Discipline" (the third Tuesday of the month). There are no production plans for this day. We deal with the subdivisions which are having trouble from the standpoint of labor discipline -- those which have unexcused absences and other violations. We call in the party organizations and the four-man leadership bodies and ask them why such a situation has arisen, what they have done to overcome it, and what the plant management can do to help them. Here we also share our work experience with the collective. We hold meetings between management and the brigade leaders and leading workers, and we speak frankly with them about our problems and listen to their advice and complaints.

And, finally, the third area of our work is improvement of social and domestic conditions. We understand that we will be able to make greater demands on workers if we create good conditions for their labor, life and recreation. Of course, it is difficult to do much in this area without using internal resources for construction. For the money which we transfer to the gorispolkom, we receive only 3-4 apartments a year. Therefore we were forced to purchase a semi-dilapidated brick plant in Novosibirsk Oblast and restore it, and now we have the capability of constructing both housing and facilities for social and domestic purposes.

During the past couple of years we have reconstructed the pioneer camp so that during the winter it could be used as a recreation base for plant workers and their families. In 1982 our camp won second place in its class for the oblast. The children's cabin was reconstructed. In 1982 a 12-story dormitory next to the plant was released for occupancy. We are also constructing a 264-apartment building right here.

We have also done a good deal in the plant. We are rearranging the domestic facilities in the shops and making them more modern and convenient. In the forging shop, for example, we are building a sauna so that after heavy physical labor the forge operators will be able to clean up, rest and relieve the tension. We have rearranged the entire system of public catering. We renovated the dining room. Flowlines for distributing food have been installed in the common room, and a room has been organized for dietetic food. Modern cafeterias have been constructed in the three large shops. The people from these shops no longer have to go to the dining room, which means that they waste less time for meals. It is also possible to have breakfast here in the morning before going to work. A store for semi-prepared food has been opened on the first floor of the dining facilities. Of course, this has not completely solved all of our problems, and therefore we have a cooperative store operating on the territory of the plant. We have concluded an agreement with the oblast consumers' union and we are selling meat, poultry, nuts and honey there.

We have also done some work on improving the medical service for workers of the enterprise. We have constructed two public health points on the territory of the plant, although, to be sure, we have become convinced that this is not enough. Now we have decided to expand them so that people can receive first aid from us.

Through these measures we managed to reduce turnover from 24 to 16.2 percent in 1982, which is lower than the average for the city. The number of violations of labor discipline has decreased. People have begun to understand that we are concerned about them and that we expect good work from them. But those positive changes which we have managed to make will not fully solve the problem of strengthening and maintaining a high level of labor discipline. At our level alone, the level of the enterprise, this problem cannot be completely solved. The enterprise is only a link in the chain of the economic mechanism, even if it is the main one.

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## IMPORTANCE OF BRIGADE IN EDUCATIONAL WORK STRESSED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 38-41

[Condensed speech of V. V. Shalimov, director of the Sibelektrotyazhmash plant, by EKO correspondents Ye. Lysaya and L. Shcherbakova under the rubric "Directors' Club": "The Brigade is the Best Educator"]

[Text] The labor collective is a complex living organism. It is not homogeneous. Its basis is comprised of conscientious workers who carry out their work honestly and, for the most part, creatively. But there are also idlers, shirkers and drunkards. There can be nothing standard in the work for strengthening labor discipline and reducing labor turnover. For many shirkers ordinary educational influence is not very effective. Therefore we were glad to see the decree of the CPSU Central Committee, the USSR Council of Ministers and the AUCCTU, "On Stepping Up Work for Strengthening Socialist Labor Discipline."

Now showing up for work in an intoxicated condition is sufficient grounds for dissolving the labor contract on the initiative of the administration. Other aspects of legal influence on violators of labor discipline have also been strengthened. To be sure, it seems to me that they could be even stricter when it comes to the worst shirkers and drunkards. Nonetheless, even now production managers, beginning with foremen and brigade leaders, can differentiate the measures and methods of educational work and devote more attention to the basic part of the collective. Of course these people too sometimes commit violations, and there are individual complaints against them. Economic stimuli and sanctions, ideological-educational work, social measures and other intelligent measures can always contribute to maintaining their discipline in the broad sense of the word (I have in mind all aspects -- labor, executive, and technological discipline). And, in my opinion, the most intelligent and effective measure is brigade organization of labor with payment for the final result.

Collective forms of labor organization have a number of advantages. This is also emphasized in the decree concerning strengthening discipline. We have introduced the Kaluga variant of brigade organization of labor with payment for the completed job of the brigade. When work of the brigade is evaluated



on the basis of the fulfillment of assignments for complete brigade jobs, all members of the brigade are motivated to achieve a good overall result.

The public forms of production management that have existed up to the present time -- PDPS (permanent production conferences) and OBEA (public bureaus for economic analysis) have not produced as much as the brigades working for the final product have because they are separate from the main thing -- direct influence on the final result of production activity.

Everybody knows how a brigade can influence a slipshod worker. In the majority of cases the effect of its influence is incomparably greater than any measures taken "from above." I wish to discuss separately something very important which the brigade does and which previously shop and section managers were unable to do -- in a brigade youth adapt more easily and rapidly to production conditions. With individual piece-rate work the young person received neither interesting work nor good pay. The section foremen were interested primarily in the "aces," the class specialists, on whom the plan rested.

In a good brigade, there is a kindly and at the same time a strict attitude toward youth: the incapable ones are taught and those who will not carry their own weight are not tolerated. That necessary labor microclimate which provides for rapid adaptation in production is created here.

The brigade contributes to efficient utilization of labor resources. It will not tolerate superfluous people. Very frequently it will take on the work of warehousemen, lubricators, and other workers who provide service for production, for which members of the brigade must master related occupations. A certain amount of additional payment is calculated for the additional functions. The advantage from bringing order into production is immense. It is not necessary to run around looking for warehousemen, batchers or transportation workers. It is not necessary for 15-20 workers to stand around idle because of one person. There can be no interruptions of production or laxity.

But a brigade tolerates shortages no better than a moisture-loving plant tolerates dry winds. It requires a high level of organization of material and technical supply. As soon as interruptions in deliveries begin, the brigades stand idle and begin to disintegrate. This, incidentally, impedes the introduction of brigade forms of labor. Unfortunately, we already experienced the bitterness of defeat when, after several months of interruptions in deliveries of metal from the Nizhniy Tagil metallurgical combine and the Karaganda metallurgical combine, there was a threat of disintegration of collectives which seemed to be reliable and strong. Therefore improvement of material support is one of the most important conditions for raising the level of organization and order in production.

As of today, in our plant there are 162 brigades which encompass 70 percent of the piece-rate workers. That is, the brigades manage the largest part of the labor collective in the main production. In our auxiliary production only 39 percent of the workers are joined together into brigades.

But we are in no hurry to increase the number of them, because it is not only a matter of the breadth, but also of the depth of collective labor processes. The decree of the CPSU Central Committee concerning further development and increased effectiveness of brigade forms of labor organization in industry gives instructions to the USSR State Committee for Labor and Social Problems, the AUCCTU and the ministries and departments to "systematically study new tendencies and determine the prospects for further development of the brigade form of labor organization and its influence on increasing the effectiveness of public production and reducing labor turnover." The enterprises and associations are in extreme need of scientific recommendations made on the basis of such a study, especially concerning the development of brigade forms in the service industries where it is more difficult than it is in the main industry to account for the final results of labor and the personal contribution of each member of the brigade.

The influence of the brigades is great, and in order to increase it we have taken measures to make the brigade councils more active. There are also shop councils which include the leaders of all brigades and the plant council which consists of the chairmen of the shop councils.

The councils discuss all issues which can influence the work of the brigades: labor discipline, conditions for labor and technical safety, material and technical supply, and so forth. The plant council meets twice per month according to a previously established plan. I attend the meetings as an adviser. The division chiefs and the head specialists report to the council. A collegial decision that is made acquires the force of law and is documented in an order from the plant director.

All this has made it possible to increase the role and authority of the brigades and to strengthen their influence on the collective. We are placing great hopes in the strengthening of labor discipline.

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## PLANNING DISCIPLINE MATERIALIZED IN OTHER FORMS OF DISCIPLINE

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 42-44

[Condensed speech of Zh. F. Kryuchkov, director of the precision machine building plant, by EKO correspondents Ye. Lysaya and L. Shcherbakova under the rubric "Directors' Club": "From Planning Discipline to Discipline at The Enterprise"]

[Text] The plan is the underlying basis of the life of any enterprise. If it is unrealistic or is not backed up by funds, various negative consequences are possible. For example, idle time because of a shortage of materials and a lack of incentive for hard work (no matter how hard you try, you will not fulfill the assignment if it is too great). Planning discipline is a most important condition for discipline at the enterprise.

"Shortcomings in planning, material and technical supply, and production organization lead to idle time and rush work, overtime work, and failure to fulfill planned assignments and commitments, they are reflected in discipline, and, in the final analysis, they affect the rates of growth of labor productivity," it was noted in the decree of the CPSU Central Committee, the USSR Council of Ministers and the AUCCTU, "On Stepping Up Work for Strengthening Socialist Labor Discipline."

How is the plan drawn up today? The Gosplan sends down the control figures for the branch. On the basis of these the ministry establishes the planning assignments for the enterprises on the basis of their production capacities, and it is also guided by certain subjective considerations, for example, it takes into account the energy of the enterprise's collective and its director. Somebody is always lagging behind, and he must be supported and given reduced planning assignments, while others can be pushed more ...

The first variant is sent down to the plant. We begin to analyze it and make calculations; our plant's "small-scale economic science" is put to work. Let us assume that we have calculated the percentage of the increase in labor productivity planned for us which we can achieve as a result of new technology, technical re-equipment and the introduction of more effective forms of labor organization, and how many additional workers we shall have to

hire in order to fulfill the production program. We submit these proposals to the ministry.

It can accept them or not. As a rule, half of them are accepted. And subsequently -- if you do not receive a sufficient quantity of new materials, you do not introduce new technology. They do not always give you the equipment you ask for either. The enlistment of additional labor resources is limited by the possibilities of the city in which the plant is located. The only thing which depends on the enterprise itself is the introduction of new forms of labor organization, including brigades.

But the plan almost does not change, for the Gosplan has already given the branch the control figures. Here, in my opinion, begins the "volitional aspect" in planning. We are forced to substantiate a plan which we know to be unrealistic. Here our "small-scale science" ends, and a fabricated effect comes on the scene, mainly from measures related to the organization of management and labor. And then the enterprise, as it were, swallows the existing situation, obtaining unsubstantiated plans. But the manager can not place the collective in a situation from which there is no way out. Hence the reduction of reported reserves, above-normative supplies, and so forth. It is difficult for the director of an industrial enterprise to work under these conditions.

It is necessary to take a scientific approach to planning. Approximate prognoses must be replaced by a strict economic prognosis, which is possible with greater independence of the enterprises and associations in planning and management of production. The decree regarding this which was adopted by the CPSU Central Committee and the USSR Council of Ministers and the economic experiment which has been started should produce answers to many questions.

I consider it very important in planning to take into account the territorial peculiarities and the coordination of the territorial and branch principles. Each of us experiences the lack of such an approach. And the initiative should come not only from the central agencies, but also from the territory. In my opinion, oblast and city soviets should conduct a meticulous and highly professional analysis of the capabilities and needs of the enterprises.

Who if not the oblispolkoms and gorispolkoms can determine the possible growth of production in the city and oblast in connection with the number of labor resources? They should probably take these calculations to the level of the RSFSR Gosplan and the USSR Gosplan.

Only an intelligent, principled approach at the level of local agencies of Soviet authority will make it possible to change the existing situation for the better. Let us assume that there are 50 industrial enterprises of various branches in the city. The numbers of workers they employ also vary. One branch gives 1 ruble per worker for housing, another -- 3 rubles, and a third -- 5 rubles. As a result, one plant releases 100 apartments a year, and another -- 20. It is understandable that the people will leave the latter.



One must not strengthen one enterprise at the expense of another. It is necessary to have programs for social development of the regions which envision comparable conditions for enterprises of various branches, with the exception of those for which more rapid rates of development are envisioned for a particular period of time.

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## IMPORTANCE OF LOCAL INITIATIVE IN LABOR DISCIPLINE STRESSED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 45-48

[Condensed speech of S. M. Zverev, general director of the Ob' leather footwear association, by EKO correspondents Ye. Lysaya and L. Shcherbakova under the rubric "Directors' Club": "Labor Discipline Depends Largely on Local Initiative"]

[Text] I fully agree with Zhorzh Fedorovich Kryuchkov when he says that many problems related to increasing labor discipline and reducing labor turnover can be solved only at the level of the oblast or city.

This pertains first of all to the utilization of labor resources. This is now handled by bureaus for hiring and labor placement under the gorispolkoms. Each enterprise concludes an agreement with them, according to which it pays a certain sum, and the bureau, in turn, must send workers to the enterprise. The bureau determines the surplus or shortage of labor force from reports of the enterprises to the Central Statistical Administration. The extent to which the work of the bureaus corresponds to their tasks is shown by this fact: in 1982 the shortage of personnel amounted to 200 people, and the bureau sent only three. Actually the enterprise hired 1,000 people (and released 800). From this, one can draw the conclusion that labor placement is taking place outside this bureau. It would seem that the staffs of the oblast, city and rayon planning commissions, which have been expanded recently, could solve more complicated problems in the area of personnel policy, to include fully disclosing and accounting for labor resources and actually keeping track of their distribution and utilization.

I shall name only a couple of "sore spots."

First. At the local level it is necessary to have a prognosis of the development of industry, including new construction and renovation. Recently the gorispolkom and oblispolkom have taken new construction under special supervision. But under the banner of renovation, on the initiative of the branches, the enterprises are frequently expanded and new shops are constructed, and this means that people are required. In the new shops, as a rule, working conditions are better and earnings are higher, and therefore

workers are happy to go there. I think that such random expansion of production should be eliminated. Renovation should be controlled.

Second. While there is an overall shortage of labor resources, many enterprises maintain more workers than they need to fulfill the production program. And this "overstaffing" is not taken into account by anyone. At the same time, on the scale of the city there are not enough working hands. It is probably necessary to increase the effect of the normative wage per ruble of commercial output, as was envisioned by the decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979, "On Improving Planning and Stepping Up the Influence of the Economic Mechanism on Increasing the Efficiency of Production and Improving the Quality of Work." Of course, maintaining surplus workers at enterprises is largely related to the fact that people are drawn away to all kinds of jobs in the city and the oblast. For us these include the construction of the subway, the building up of the city, and work in patronage organizations. I think that the city planning commission should plan to take workers away only in terms of the statistics from preceding years. Then a wage fund would automatically be planned for the enterprise for these purposes. The number of workers who are taken away would correspond to the capabilities of the enterprise, and production would not suffer. We managers would not have to use fair means and, frequently, foul ones to "wiggle out" of difficult situations.

Third. Various enterprises of the city pay different amounts for jobs with the same title. This reduces the significance of the wage rate and contributes to searching for "easy money." Compressor operators of the 6th category, lathe operators and milling machine operators, for example, receive 30-40 percent less from us than they do from certain plants of other branches. It is disheartening for us to see how we ourselves are provoking the migration of personnel from one enterprise to another. One gets the feeling that each branch and enterprise establishes for itself the earnings for individual categories of workers.

Fourth. For some reason we are unable to adhere to a single work schedule within a city. The gorispolkom has approved so-called work Saturdays so that the work time during the course of the week will amount to 41 hours. There are 13 of these Saturdays in a year. But many enterprises refrain from using them, establishing their working day at 8 hours 12 (1) minutes. There are frequent cases in which a plant which has refused to institute work Saturdays still has to operate on almost every one of them. But the people receive higher wages, as for overtime work on their days off. It is necessary to have a unified approach and a general policy here, which would be established and controlled by the gorispolkom.

Fifth. The allotment of housing in regions that are distant from the enterprise is an equally painful problem. People who have received an apartment in the other end of the city will look for work closer to home. And since the first ones in line for better housing conditions are, as a rule, the permanent staff workers, these are precisely the ones whom we frequently lose. This, of course, is especially troubling. Thus our enterprise is located on the outskirts of the city, and we hire people who used to live in rural areas,

who live in the suburbs and also those who are in need of housing. Thus the situation with respect to housing is almost not improving.

Also of no small importance is the fact that for approximately the last four years, we have been losing about 30 percent of our capital investments in housing construction because of the fact that Glavnovosibirskstroy is not assimilating the funds. Of course, after that happens the branch cuts the funding allotted to us for housing construction.

Or there is the problem of the lack of transportation during the night. The enterprises frequently do not keep their work schedule because of this, and again the people leave ...

All of these issues are within the competence of local agencies.

I wish to discuss one more problem which I consider to be important for the manager of any enterprise. This is work with people. Today's worker is not the same as he was 20 years ago. You do not get better discipline from him by yelling, even if you also pound your fist on the table. In response to this he will simply resign. But you, the manager, must create a collective which is able to work. And here it is necessary to be both a psychologist and a teacher, relying mainly on intuition. And not everyone is equally capable of doing this, and many people have to stumble and fall many times before they develop for themselves methods of working with subordinates. We need knowledge of social psychology.

This is hardly a new subject, and everyone agrees on it, but as far as I know, the matter never gets beyond discussion. We have skimmed the cream off from scientific organization of labor, and now everything is more complicated. We need serious assistance from science. We cannot gather a group of psychologists here at the plant, because it is too costly and we do not need a permanent service like that. But to create a paid consultation bureau on a contractual basis in the city -- this is what I as a director need today. Of course, good experience exists, but we cannot imitate, for example, the experience of the Tiraspol sewing factory. The labor resource situation is different in that region. But we are working with a shortage of personnel and are forced to accept almost anyone. I should like for specialists to look into the enterprise's problems and give their recommendations. I think this would be useful for more than just our association.

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## MANAGERS ACCOMPLISH MORE IN COOPERATION

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 49-51

[Condensed speech of S. S. Gorbenko, chief of the electric locomotive repair plant, by EKO correspondents Ye. Lysaya and L. Shcherbakova under the rubric "Directors' Club": "I Advise Cooperation of Managers!"]

[Text] Labor discipline and concern for people are two aspects of the same problem. I shall try to demonstrate this using the work experience of our plant.

We repair electric locomotives which travel from Kazatin to near Kiev and to Vladivostok, from Gorkiy to Mineralnyye Vody, and also along the Central Asian and Northern Caucasian railroads.

What does our work consist of? Taking the electric locomotive apart, cleaning it (and we remove up to three dump trucks full of dirt from each machine), replacing worn-out parts, with the body being practically the only thing left, and repairing everything else. The work is difficult, but we do it fairly well. The quality of the repair work is shown by the fact that the warrantee period for work on heavy engines of electric locomotives which we have repaired is longer than that of a new machine.

Our plant was built during the war, according to the norms of that time. The necessary production capacities were created, but at that time there was not even any question of housing facilities. And the enterprise was built a long distance away from the city. In order to attract people, we had to build the entire socio-domestic infrastructure in the village for ourselves. The only thing that was constructed for us by contractors was the movie theater. And we built for ourselves the house of services, the bath, the secondary school, the laundromat, the complex of children's institutions (residents of the village are fully provided with accommodations in kindergartens and day nurseries), the music school, the polyclinic, the complex of stores, the swimming pool, two sports arenas, two stadiums -- one for hockey and one for light sports -- and, a lighted ski trail.

We are now "pulling" all of the social, cultural and daily life of a village of approximately 8,000 residents. And the village itself is not at all the

same as it used to be. Now it is essentially one of the rayons of the city. New industrial enterprises and construction organizations have appeared next to us. They take advantage of the benefits we have created without investing a ruble in the construction or upkeep of the social and domestic facilities. And now I am coming to a problem which bothers me very much. I advise cooperation among managers of enterprises when solving the problems facing their city.

In the final analysis, the creation of attractive conditions for the life of all citizens of our city, regardless of where they work, ends up in a reduction of labor turnover, reduced losses of working time, and better labor discipline. Now, unfortunately, we have a paradox: the person who is burdened with problems of his own life forgets about problems of arranging the life of his workers, and vice versa. The local soviets should probably be more active in solving these problems.

It would be fair to transfer everything we have created to the books of the city services, but they are experiencing difficulties with their management and do not want to take on additional concerns, rejecting even the service of running water. The only thing we have transferred to their books is the bath.

Of course, all this has required and is requiring large expenditures from us. Today, when the neighboring enterprises have created good living conditions within the plant, we, as usual, are spending large amounts of money on maintaining the normal condition of the social, cultural and living facilities. And we are harvesting bitter fruits. In the 1960's, our labor turnover amounted to 12 percent. Then it increased to 24 percent. By exerting all efforts, in 1981-1982 we dropped to the city level, reducing this indicator to 16.4 percent. I think that 15-20 percent of those who leave do so because of the poor living conditions within the plant.

It is difficult to make up for what has been lost. The more so since we must maintain and repair everything that we have constructed outside the plant, and also carry out construction within it. And every manager knows what it means to carry out construction with one's own forces when there is a shortage of construction materials. We have not planned a modern domestic facility to accommodate 1,600. We are trying to include it in the plan for 1984. The general contractor, Zapsibtransstroy, is still not very understanding about our problems. It will be the first construction project within the plant.

Possibly the situation in which our plant has found itself is not typical. But I still wish to express a couple of ideas about how it can be surmounted.

In the first place, it is necessary to break down the logic of branch thinking. Now the main concern of the branches is the startup of production capacities. But they are frequently not utilized properly because of the poor domestic conditions at the enterprise. Today our main attention has been directed toward housing construction, but this is only part of the problem of retaining personnel, albeit perhaps the most important part. We should probably introduce a section entitled construction of domestic facilities at enterprises which are financed by Stroybank.

In the second place, I think the conditions whereby the fund for social, cultural and domestic conditions is created should be revised. It would be expedient to calculate it not in terms of 1 ruble of commercial output and not per 1 worker, but taking into account all that the enterprises have already created in this area. For in the end this must be taken into account! Up to the present time, as far as I know, even the question is not being raised as such. We are waiting for the AUCCTU, the State Committee for Labor and Social Problems, the Gosplan interdepartmental commission and the branch trade-union committees to take steps in this direction. Now it makes no difference whether you have built a snow man in the central square for New Years or done what we have done -- the same approach is taken to deductions for social, cultural and domestic facilities.

In the third place, the AUCCTU has established strict payment for the rent of sports facilities, taking their area into account. I must say that ours are used from 6 a.m. until midnight. And half of that time they are being used by outside organizations. And the rent is so low that it does not even cover the wages of the personnel. In this situation, the renter -- the one who is not building anything and has no intention of doing so -- ends up in the most advantageous position. And the one who bears all of the burden for maintaining the sports facilities has to squeeze his way through as best he can. We have now been placed in difficult conditions because of the wear and tear on the fixed capital for daily living, and we are repairing this ourselves. We hope that these difficulties will be reviewed once again.

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## SOCIAL PROBLEMS OF SMALL ENTERPRISES ENUMERATED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 52-54

[Condensed speech of Ye. P. Govzman, general director of the L'nopen'kotrest association, by EKO correspondents Ye. Lysaya and L. Shcherbakova under the rubric "Directors' Club": "Small Enterprises Face Large Social Problems"]

[Text] Stepan Stepanovich Gorbenko was quite right when he said that social problems should be solved cooperatively by all enterprises located in the rayon, and definitely with the participation of the territorial agencies. But if it is not easy for such a large enterprise as the electric locomotive repair plant, which is a real giant compared to our flax and hemp plants, to operate alone, what about our small enterprises, which are frequently located in remote rural regions!

Our association includes 31 flax and hemp plants in four oblasts of Western Siberia, and Altay and Krasnoyarsk krays. There are from 50 to 300 people working at each of them. Some of them are located in such remote areas that you cannot get to them in the spring and fall. It is difficult to ship the raw material from there. And it has been in greater demand recently -- there is a shortage of linen fabrics. Light industry is now paying more attention: they have increased the workers' wages and updated the production capital. The improvement of working conditions and wages has had a favorable effect on the stabilization of the collectives of the enterprises. Labor turnover has decreased in recent years. During 1982 we even had 100 extra people in the association. But this was not because of inflating the staff, but because of the unfavorable weather conditions in Western Siberia in the summer of 1982. The severe drought caused lower yields. We ended up with insufficient quantities of raw material, which caused the production volumes to decrease. And this is why we had surplus labor resources.

People who have been living in rural areas for a long time and have been working in our plants for many years are quite satisfied with the conditions for labor and life. Their average earnings are 180 rubles and they have subsidiary farms. The labor turnover comes from those who have just arrived, or are sent here through organized recruitment. We give them housing, and we have our own kindergartens and day nurseries. But people complain about the



boredom, about the distance from the city and the poor transportation. The people who come here drink a lot, and they are absent after paydays.

We are experiencing special difficulties with engineering and technical personnel. Young specialists do not wish to live so far away from the centers. And in fact we cannot offer them anything but the minimum of social benefits as compared to those available to workers in city enterprises. Even if we do have clubs, they are not always in operation. The trade-union normatives explain it: there must not be a staff unit for club chief if the enterprise has less than 200 workers. There is no slot for a physician at the medical aid station for the same reason. Schools have been eliminated in settlements and small villages. But not every family will agree to have their children grow up away from home . . . But still we open clubs, medical aid stations and kindergartens and maintain staff units at the expense of the enterprises. The financial agencies penalize us for this.

Or there is the problem of new construction. Contract construction organizations do not wish to go into the remote areas. As a result, we must carry out construction through our own means. And this is not always what is needed. Both in terms of quality and in terms of cost. Moreover, there are not enough workers in rural areas either.

But what should be done? We have arrived at this variant in the branch: consolidating the flax and hemp plants. In certain oblasts there are now up to 700 workers at an enterprise. But the first step has been taken, and we have not gone any further. We have not solved problems related to shipping the raw material or provision of workers (we intended to construct good buildings with all the conveniences in the consolidated villages, but this has not been done yet).

I am in favor of retaining small plants in villages, right near the sources of the raw material. But we must do everything possible so that people there live no worse, and perhaps even better than people in the cities do: for here they are surrounded by the beauties of nature. Clubs, physicians' posts and very comfortable residential buildings could be created if the small enterprises of various departments would construct them on a shared basis under the aegis of the rayispolkom. For look how many various organizations there are in the villages now, beginning with the procurement agencies of Soyuzsel'khoztekhnika and enterprises of the food and meat and dairy industry, and ending with branches of large machine building production associations! We must not lure personnel away from one another and not compete in creating benefits, but solve the social problems of small population areas through common efforts on a shared basis.

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## DUTIES OF ENGINEERING, TECHNICAL PERSONNEL ELUCIDATED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 54-57

[Condensed speech of G.I. Loginov, chief of installation and technological administration, by EKO correspondents Ye. Lysaya and L. Shcherbakova under the rubric "Directors' Club": "Engineering and Technical Personnel: Not Only Arriving On Time, But Also Working Productively"]

[Text] In questions of production discipline, the active position of management personnel is especially important. First of all, this means making decisions promptly. This is especially important in modern production. I recall the following incident.

There was only a week left before the end of the month. I asked the deputy head engineer how things were going with the fulfillment of the plan for one important order. He started to explain that he could not answer that question because pipes had not been received from a client. But I remembered that similar pipes had been received from another client for a different order which was less urgent. Why not use them? The person with whom I was talking said that he could not do this since a decision had been made not to fill certain orders at the expense of others. True, there was such a decision. But there were also other decisions: to act taking the actual situation into account. Had this been done we would not have been discussing the fact that the fulfillment of the plan for the month was being threatened. And the workers who make unfinished pipes would not have been standing around idle, but would have been working on fulfilling the program for the current month.

Why are such situations possible? One of the reasons, in my opinion, is that for approximately the past 10 years people have been very actively developing provisions and job instructions with the idea that the more detailed they are the better. But I think that too many details are harmful. The individual loses his initiative, acting only in the prescribed way. An entire category of managers has appeared whose main goal is to observe job instructions. And there is no time left for solving production problems. We must not hide behind the management structure that has taken form, behind those normative acts which have not been abolished yet, but whose instructions lead us astray (such are the provisions concerning divisions, provisions concerning the movement of orders, and others).

Second, decisions must be justified and profoundly developed. A management decision that is not well thought out can discredit an idea. For example, the head engineer comes to me and says indignantly: "Here are the orders that came from the ministry about the repair of special clothing. Several months ago I suggested opening a shop for this purpose and you were against it."

But that suggestion was not properly substantiated. How many people would have been needed? Where would they come from? Where could one find premises with an area of approximately 80 square meters? If someone were to be moved, who would it be and where?

It is useful for the manager to register such work situations and then, when they are analyzed, they provide material for contemplation. Otherwise everything is forgotten and distorted. There was something, but what . . .

How active the production position of the management worker is depends on his desire not to spoil his relationships with people. This aspect seems very important to me.

About 7 or 8 years ago we were very involved in "smoothing out human relations" in the collective, as a result of which we violated both mutual demands and the demands of the manager with respect to workers in his subdivision. Today he is called to account for the misdeeds of his subordinates, and tomorrow, by way of a check, the party committee raises the question on the work of his services. A commission is created which includes his subordinates. Frequently their goal is to find the defects of this official. It is good if the person has a strong character and nerves of steel and is capable of withstanding this. But it also happens this way: one minute he is called on the carpet, and the next -- he changes jobs. Of course, control is necessary, but it must be intelligently arranged.

But how does one provide incentives for an active production position on the part of managers and engineering and technical personnel? In my opinion, there is only one solution -- payment for the final result, and not for the amount of time worked.

Let us consider as an example the development of complicated programs. All of the work is broken down into stages (quarters, as a rule). The developers receive bonuses for fulfillment of the quarterly assignments. And when the entire program is finally ready, it might turn out that it does not work and requires adjustments. That is, people have been paid bonuses for defective work. And if the person had received only his wages during the time of the development, and had received or not received the quarterly bonus after the program had been checked, he would have had more interest in the final result.

Understandably, accounting for the final result depends on our ability to determine the proportion of the expenditures of each category of worker. We cannot set a norm for the labor of the worker. But what about engineering and technical personnel and managers? So far there are no practical developments here. I think that economists should be dealing with this. And in the interests of this matter it is time to increase the role of the subjective evaluation of the manager. Today it has clearly been degraded. The manager

of an enterprise can neither penalize a person as he considers necessary nor encourage him. He has the right to take away only 50 percent of the bonus and to add only 30 percent.

It is possible to think up a system of restraints which would accompany a subjective evaluation. At our enterprise, for example, when summing up the results of socialist competition we use the "manager's coefficient." It can be no less than 0.8 and no more than 1. I can influence the distribution of positions among the subdivisions, but I cannot "drive" the winner into the middle positions. It seems to me that we should have something similar when it comes to evaluating engineering and technical personnel.

How do we create incentives for an active production position on the part of managers and engineering and technical personnel?

Of course, we utilize encouragement and punishment. Sometimes it is necessary to deprive even our own deputies of their bonuses, through the higher organization.

The tone at the enterprise is set by the manager, but he should have a team of deputies who think as he does. We have this practice. At 8:15, 15 minutes before the beginning of the work day, all the deputies gather in the office of the chief for a little coordinational planning session. The group is not large, the people can speak frankly, and they have the opportunity to submit complaints to one another. And it is the work that is evaluated and not the human qualities of one manager or another.

We attach a great deal of importance to the system of personnel advancement. Suffice it to say that 70-80 percent of the managers of certain categories are promoted from the reserve. All the workers who are included in it know about this, and we review the reserve once a year.

For people who are applying for promotion, we make a practice of using them as replacements when the regular worker is absent (on vacation, and so forth). Of course they do not solve strategic problems for the month, but they have very interesting suggestions which are carried out after the regular worker returns to the job. Then come instructions which exceed the worker's present level of competence. They can be instructions from the minister. It is suggested, for example, that they prepare a plan of measures for economizing on resources. The person begins to work. Of course it is more difficult for him than for someone who is vested with administrative authority, but still it is immediately clear what he is capable of on the organizational plane and how he works with people. The candidate's abilities are "exposed" and one must say that this examination is sufficiently objective.

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## COMBINATION OF SOCIAL, LEGAL MEASURES URGED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 58-62

[Condensed speech of G. A. Pimenov, chief of housing construction combine, by EKO correspondents Ye. Lysaya and L. Sheherbakova under the rubric "Directors' Club": "I Am In Favor of Combining Social Measures and Legal Responsibility"]

[Text] A good deal is said here about solving social problems in order to reduce turnover of personnel and to strengthen labor discipline. I may seem like a conservative person, but I shall express my opinion anyway: we should not overestimate the social side and underestimate the legal one. The decree adopted by the CPSU Central Committee, the USSR Council of Ministers and the AUCCTU, "On Stepping Up Work for Strengthening Socialist Labor Discipline," and the Ukase of the Presidium of the USSR Supreme Soviet of August 1983 concerning further improvement of legislation for strengthening discipline grant extensive legal opportunities to managers.

The fact is that lackadaisical people who are little concerned about state interests are always on the alert to protect their own. They frequently know as well as the managers what is provided and what is not, and they will go to all authorities with complaints when they have been illegally offended. There is also another aspect of the problem, which cannot be forgotten. Let us say that we deprive a truant of the right to priority in obtaining an apartment or a place in the kindergarten or day nursery. His family will be the ones to suffer most from this. Therefore it seems to me that we should apply first those sanctions which pertain directly to him. If he has been absent without an excuse for several days, let his vacation be reduced by that number of days, and then maybe he will learn to take his rest as conscientious people do. If he has come to work drunk or has been absent without an excuse -- let him work for 3 months in another job of a lower rank, and so forth.

While advising the strengthening of legal sanctions against violators of labor discipline and order in production, I certainly do not deny the need for social and educational measures. I am in favor of combining them. I have reached this position by suffering through many years of work in construction organizations where work with personnel is considerably more complicated than it is at industrial enterprises. The freezing weather, the rain and the snow -- they are all against us. Even the sun is frequently not our friend, but

our enemy because we have no roof over our heads; we build them for others. It is a very unpleasant occupation to go through the city and ask the enterprises to assign people to assist in preparing an object to be released. This must be experienced at least once in order for it to be understood.

In order to eliminate the shortage of labor resources we have to conclude agreements with people who make a commitment to work conscientiously in the combine for 2-3 years, and we guarantee that they will be given housing for that amount of time. These workers do not have unexcused absences and they do not end up in the drunk tank. But once they have earned their apartments they immediately leave us since they do not want to spend the rest of their lives in construction. Therefore we cannot place our hopes either in these people or in the temporary people who are sent to us by the involved organizations for the period of preparing an object for release. We have to rely mainly on our own forces and capabilities, that is, on strengthening labor discipline and retaining personnel. The solutions to both problems are inseparable.

During the past 10 years the coefficient of turnover at the combine has dropped from 27 to 12 percent. True, in 1982 there was an upward leap of 1.7 percent. But this took place because one more enterprise was transferred to the combine -- the plant for reinforced concrete items No 1 [ZhBI-1]. When there are large changes in the life of the collective the personnel stability is always violated. This also happened at ZhBI-1. But all the necessary measures were taken so that the new collective would adapt to the combine without large losses, and by the middle of 1983 personnel turnover had dropped to our best indicator, although, of course, it was still far from ideal.

The Novosibirsk housing construction combine is now one of the largest in the eastern part of the country. Two of its enterprises -- the large-panel housing construction plant and the plant for reinforced concrete structures -- produce about 500,000 square meters of dwelling space each year. We send about 100,000 to the Tyumen North, and the remaining 400,000 we assemble in Novosibirsk and the oblast through our own installation flowlines and the Novosibirskzhilstroy-1 Trust. The new series of buildings, which is being prepared at ZhBI-1, makes it possible to assemble buildings with any number of stories, even one or two. What could be better for rural areas?

Important conditions for raising the organizational level and improving order in each working position are improvement of working conditions, mechanization and automation of production. Previously we had a large amount of labor turnover in several places in the technological flowline of the large-panel housing construction combine because of the noise and vibrations. Therefore when changing over to the production of the new series of buildings, which were developed by Novosibirsk architects (they are intended for our climate conditions and have planning which is convenient for the residents), conveyor production technology was created with comprehensive mechanization and automation of technological processes. The vibration was reduced, there are no labor-intensive manual processes, and the great advantage is that the conveyor can produce buildings with from 9 to 16 stories without any special readjustment.

The most stable personnel are on the assembly flowlines. Almost immediately after we learned of the work methods of the brigade of the Moscow builder Nikolay Zlobin, we introduced brigade cost accounting [khozraschet] with payment for the final result -- the final release of the building to the residents.

It is especially important to keep young workers at the enterprise. And here truly a great deal depends on managers of high and low levels, beginning with the brigade leader, and it is precisely here that we should take advantage of all measures for socio-economic and educational influence. For when a young person goes to work, he enters adult life at the same time. The norms of behavior and the labor traditions which he assimilates will influence all of his subsequent attitude toward labor.

One must not forget that almost at the same time as a young person goes to work, his family life begins. For many years we have all somehow forgotten about this and have offered the young worker nothing more than a place in a dormitory. Look at what many workers' dormitories have become! In a room there is a young family with a child and also a male or female neighbor if he (or she) has not been moved into another room beforehand (the family cannot be separated!). Now people everywhere are looking for new ways of helping young families. In Chelyabinsk and Sverdlovsk, for example, they have begun to create housing construction cooperatives for them. We too are taking this path, and at the same time we are constructing buildings for small families by a method that involves using internal means. The apartments in them are small and they have kitchens that are set up for several families. But the young families receive a separate room immediately, and they do not have to think about a private apartment or be cooped up in a dormitory. At the same time, they get in line for housing and receive it the same way as everyone else does.

When speaking about labor discipline one cannot forget about the losses of time, which I would attribute more to the administration and engineering and technical personnel than to the workers. These include vacations without pay with the permission of the administration (not always with a good reason) and idle time because of a lack of materials and disrepair of the equipment. They also cause considerable harm. In order to eliminate them, we are taking measures to improve executive discipline and the responsibility of managers and engineering and technical personnel. There is a system of economic incentives in effect in the combine, and it reflects the individual results of the labor of this category of workers.

But the extreme differences in the wages of engineering and technical personnel and workers make it difficult for the manager to insistently demand increased executive discipline. Previously, we were criticized for the number of practical workers in engineering positions, and now we are criticized for the fact that there are many engineers with diplomas in ordinary jobs. Of course these are not the people we are trying to keep in labor positions. But what should be done? When we begin to persistently offer them jobs as line engineering and technical personnel, they either refuse them and remain in the labor position, or they go to planning institutes.

Of course, certain measures are being taken to retain engineering and technical personnel. It is known that in construction, we have established work tenure as line engineering and technical personnel, which gives them the right to pension benefits. We have restored payment for time in grade in construction. In order to improve the payment for engineering and technical personnel and to bring their interests closer to those of the brigades, we are following the practice of the Elektrosignal plant by including engineering and technical personnel in comprehensive brigades.

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## OPERATION OF BRIGADES IN DNEPROPETROVSK PLANT DESCRIBED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 63-78

[Article by P. M. Baltaksa, deputy director for economic problems of the Dnepropetrovsk Metallurgical Equipment Plant: "We are Oriented Toward the Brigade"]

[Text] [Editorial Introduction] The Dnepropetrovsk Metallurgical Equipment Plant (DZMO) is included in the system of the USSR Ministry of Heavy and Transport Machine Building. In 1983 the plant was 70 years old. The annual volume of commercial output is about 100 million rubles. The nature of production is single-unit and individual. The plant includes a planning-design technological institute for metallurgical equipment.

The DZMO produces a considerable share of the union-wide volume of blast furnace and steel smelting equipment -- technological equipment and means of mechanization and automation of labor-intensive processes (slag carts, carts for casting molds and so forth). The plant also specializes in heating furnaces for rolling mills. Finally, it is the head enterprise in the country for producing subway tubings. They have been used in the subways in Moscow, Leningrad, Tbilisi and Tashkent.

The DZMO delivers its products to the most important startup complexes -- the Orsk-Khalilovo metallurgical combine and the Donetsk and Zhdanov metallurgical plants. Its equipment has been installed in plants in Krivoy Rog and Lipetsk.

Almost 32 percent of the plants products have been awarded the State Emblem of Quality. About 18 percent of them go for export to 18 countries of the world, including France, Sweden, Italy, Belgium, Mexico and India, and also to countries of the socialist community. Cold slabs for blast furnaces are in especially great demand.

The enterprise's good traditions in introducing advanced methods of labor organization, including brigade forms, are known in Dnepropetrovsk Oblast. Today we are offering the readers an article on the experience in work with brigades at the DZMO and the problems which workers of the enterprise still have to solve.

It is impossible to produce highly productive, modern equipment without well arranged production. Yet we could not be satisfied with the operation of the enterprise in the middle of the 1970's: only 3-5 percent of the products had the Emblem of Quality. We experienced a constant shortage of personnel. The fact is that the DZMO is surrounded by metallurgical enterprises which have certain privileges, and therefore it is more difficult for us to keep people. The provisions for the machine tool operators are reflected especially poorly in the work of the enterprise. At the DZMO their qualifications are fairly high -- the average category of a machine tool operator is 4.5. It is not easy to train a worker with these qualifications, and it takes 5-7 years. The shortage in the labor force is also maintained because many people are drawn into agriculture, construction and city beautification. Suffice it to say that each day, up to 500-600 of our people are working outside the plant.

Our plant is not young, and we must always be working under conditions of renovation without halting the basic production. Thus the tubing shop has already been renovated, and now they are renovating our "gates" -- the shaped casting shop. Under these conditions it is difficult to keep labor productivity at the level of the control figures.

We have begun to search for a solution which would make it possible to solve not just any one of the problems facing the enterprise, but the entire complex of them. The brigade organization of labor was such a solution for us. And now the plant's management mechanism is oriented primarily toward the brigade. But after studying and borrowing the experience accumulated at enterprises of the country, we immediately took the path of cost accounting (khozraschet).

#### The Brigade Under Conditions of the DZMO

The brigade is the main active unit of the enterprise, and the entire labor collective is interested in the results of its work. At the plant there are now 277 brigades which join together 78 percent of the overall number of workers and produce 85 percent of the normative net output. For 97.6 percent of the workers in brigades the wages are distributed according to the coefficient of labor participation [KTU].

A standard has been developed for the enterprise, which regulates the duties of the plant's structural subdivisions in the process of brigade organization of labor. It is entitled "Efficient utilization of labor resources. Brigade organization of labor with payment for the final results and distribution of earnings according to the coefficient of labor participation." The experience of its introduction has made it possible to single out the main stages in the creation and development of brigade forms of labor organization.

A certain stereotype of a brigade has taken form at the plant. It takes into account the specific features of a machine building enterprise with the unit type of production. Its main features are:

the entire collective of the brigade works under one order with payment for the final result;

all of the earnings (and not just the bonuses and additional payments) are distributed according to the coefficient of labor participation, depending on the individual results of the work, that is, workers with high qualifications are not left at a disadvantage;

there is extensive combination of occupations and the mastery of two or three related occupations, work with a smaller staff, and the servicing of more than one machine tool;

the brigades are consolidated to include workers from the whole shift or section, and they are comprehensive;

the work is organized according to an all-encompassing schedule (all shifts work on the same contract);

agencies for workers' self-management have been created (councils of the brigade, shop and plant);

there is extensive application of brigade cost accounting (khozraschet) (contract) as an indispensable part of the intraplant cost accounting;

material incentives are for the results of the cost accounting activity in keeping with the personal contribution to economy -- according to the coefficient of participation in savings (KEU);

they have organized socialist competition, both individual within the brigade, and collective -- among brigades and under mutual agreements among brigades which are linked by a technological chain;

equipment, instruments, fittings and production space are assigned to the brigade;

the brigades are all under the jurisdiction of the same direct manager -- the foreman.

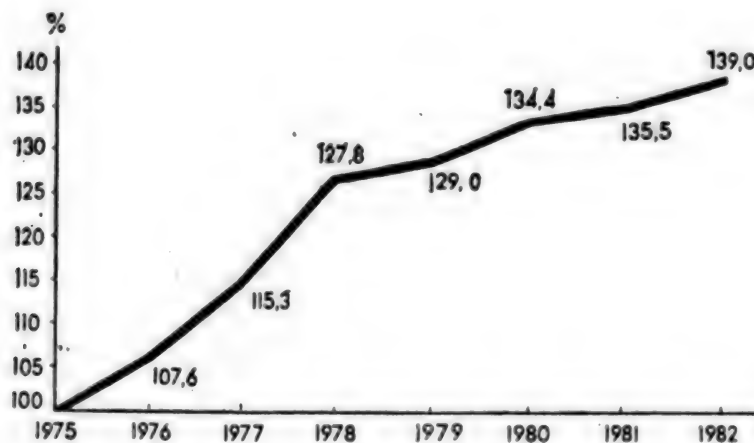
When creating these conditions we paid attention to the close interconnection between the technical level of production and labor organization. The introduction of new technical equipment and progressive technology objectively conditioned the development of brigade forms. But now the latter are already requiring constant improvement of production and of the entire economic mechanism. In this connection, we attach great significance to standard shop plans for the organization of labor and production. The changeover to standard plans in just four shops of the plant (forge-press, thermal cleaning, installation and assembly, and mechanical assembly) made it possible to release 75 workers during a year and to achieve an economic effect of about

170,000 rubles. The sections in these shops have been redesigned; the work positions have been completely supplied with organizational equipment, containers and technological equipment; regulated service has been introduced for the workers; and working conditions have been improved. The work positions of a total of about 3,000 workers are organized according to standard plans. Statistics show that in shops where standard plans have been introduced labor productivity increases by 8-10 percent.

#### Intraplant Cost Accounting (Khozraschet)

As was already said, it is not enough to create brigades. Certain conditions are necessary for continuous growth of labor productivity in existing brigades. As practice has shown, the changeover from individual piece-rate work to the brigade method with work under a single order and distribution of the earnings according to the KTU [coefficient of labor participation] makes it possible to sharply increase labor productivity in the first 2 years. In the first stage this takes place because of improvement of labor discipline, the development of tutorship, increased intensiveness of labor, the development of socialist competition and improvement of the system of payment. Intragrade reserves are mobilized which, in the final analysis, also provide for growth of labor productivity by 10-12 percent and wages -- by 7-8 percent. (The dynamics of labor productivity at the DZMO are presented in the figure). But we have noted that as these reserves are utilized, the growth rates of productivity slow down. In certain brigades, after 4-5 years of operation, there is a reduction of the effectiveness as compared to the maximum that had been achieved, and productivity in the brigades stabilizes, and in some cases it decreases. The moral and psychological climate deteriorates and "friction" appears among individual members of the brigade. Why does this happen? The fact is that the reserves that lie on the surface, as a rule, are exhausted by this time. The brigade, as it were, "marks time." It is necessary to have new levers for intensifying the economy of the entire enterprise, which motivate people not only to work highly productively and well, but also to economize on resources.

Figure. Dynamics of Labor Productivity at the DZMO, in Percent





We have found the solution in the introduction of cost accounting (khozraschet). Khozraschet is arranged on the following fundamental principles: the allotment of resources to the production unit (shop, section, brigade); economic and operational independence; self-repayment and ensurance of the profitability of production; and unity of material incentives and material responsibility.

But khozraschet should penetrate into all of the hierarchical chain of plant -- shop -- section -- brigade. Only then will it be effective. To accomplish this, the economic services of the DZMO as early as 1976 developed methodological materials which devoted attention to the determination of the planning and accounting indicators, improvement of the organization of production and labor, systems of material incentives, control and analysis of the results of production activity, the organization of khozraschet interrelations and socialist competition, raising of the level of the workers' economic knowledge, and study and dissemination of advanced practice.

Now all the shops of the plant, 44 production sections and 54 brigades, and also the divisions for material and technical supply, external cooperation and staffing, and automated control systems for the enterprise are on khozraschet. We attach special importance to the development of lower-level khozraschet at the level of the sections and brigades. We have developed a standard for the enterprise entitled "The organization of cost accounting in production sections and brigades." In keeping with it, each production subdivision, depending on the nature of the work it performs, is assigned a set production volume (in norm-hours, according to the normative net output or in physical terms -- tons, parts, components, items); indicators for labor (number of workers, wage fund, labor productivity); indicators of product quality; expenditures on production (production cost minus conventional permanent expenditures, expenditures on instruments and auxiliary materials, expenditures on maintaining and operating equipment); and the level of fulfillment of delivery agreements.

A central aspect of the management of khozraschet subdivisions is the development of the plan. We devote our main attention to the balance of the planning indicators of the brigades, sections, shops and the plant as a whole. In order to improve and accelerate the development of the plans, the plant economic service utilizes data from the certificate [passport] of the enterprise and the cards for accounting for the economic effectiveness of the work of the brigade, which are actually the certificate of the brigade (an example of such a card is given below).

Of great significance in increasing the substantiation of the plans is the policy established for the plant whereby they are worked on collectively by the brigade council. For example, the council for the comprehensive all-around khozraschet brigade of lathe operators (85 people, leader -- winner of the USSR State Prize, M.D. Vorob'yev), when considering the monthly plan, weighs the capability of each member of the collective to increase labor productivity and to work the number of machine tool-hours planned for the month, on the basis of the number of workers and their qualifications. The council clarifies the need to bring in engineering services and develops organizational measures which provide for the fulfillment of the plan. As a

rule, they envision the utilization of reserves for increasing the effectiveness of labor at each working position, the placement of machine tool operators who have mastered related occupations, group servicing of more than one machine tool, the application of universal pre-assembled adapters and instruments, the assignment of tutors to young workers, and so forth.

# CARD FOR REPORTING ON ECONOMIC EFFECTIVENESS OF BRIGADE WORK

## I. General Information About the Brigade\*

Shop 06 Section 1 Brigade for mechanical processing

Brigade leader -- KHORYAK, A. N. Section chief

(senior master) RUSSKIY, M. M.

Overall number	29
Basic workers	27
Auxiliary workers	2
Shock workers of communist labor	12
Date of organization of brigade	1-09-1976
Foreman	Krivosheyev, V. V.
Number of piece-rate workers	26
Number of time-rate workers	3
Payment for labor	piece-rate-plus-bonus time-rate-plus-bonus
Distribution of earnings	According to KTU
Brigade production plan for year	83,364 norm-machine tool hours
Assignment for increasing labor productivity for year	12.3 percent
Assignment for reducing labor-intensiveness for year	3.15 percent

\* Abridged

## II. Economic Effectiveness of Brigade Work

Indicators	Monthly results	
	January	Feb, etc.
	plan/actual	plan/actual
Fulfillment of production plan, in percent	108	121
Number of workers	36/30	36/32
Average product output per 1 worker, norm-hours, thousands	130.5/169	128.2/162.7
Growth rates of average output, in percent	19.1/20.0	20.1/29.3
Wage fund, rubles	7,345/7,588	7,347/8,203

Average monthly earnings, rubles	209.2/249.1	209.3/260.6
Growth rates of average monthly earnings, in percent	18.2/18.7	16.8/25.6
Losses of working time, man-days	132	105
Including:		
Unexcused absences	--	--
Idle time	132	105
Leave with permission of administration, man-days	--	--
Coefficient of utilization of equipment	71.1	73.3
Economy of material resources, rubles	356/352	343/334
Economic effect from efficiency work, rubles	--	--
Release of products at first request, in percent	71.8	97.3
Losses from defects, rubles	--	--
Period in which the brigade is working, month, year	04-83	05-83

Every khozraschet brigade works on one order. An important detail: 98 percent of the brigades of the DZMO which join piece-rate workers together distribute all of the earnings according to the KTU [coefficient of labor participation], and not just the bonuses. This is a powerful stimulus for more efficient work on the part of the brigade. With such a system there can be no people who shirk their duties. And the bonus is distributed according to the KTU only among time-rate workers.

Table. Main Stages in the Creation and Development of Brigades at the DZMO

Comprehensive analysis of expediency of creating a brigade	Determination of calculation (base) coefficient of labor participation (KTU)
Conducting a complex of organizational and technical measures for preparing production	Determination of variants organization of combining occupations and servicing numerous machine tools in the brigade
Determining the number of personnel, organizational skill composition and the organizational type of the brigade	Organizing payment for labor in the brigade
Calculating planned number of auxiliary workers	Electing brigade council and brigade leader

Selecting personnel composition of brigade	Organizing socialist competition within brigade and among brigades
Conducting explanatory and mass agitational work Organizing training	Introducing khozraschet and incentives for the coefficient of participation in savings (KEU)
Concluding labor agreement for voluntary entry into brigade	Changing brigade over to brigade contract

Of course it was necessary to convince people of the need for such a step. We told the workers that if one person fails to show up for work, the entire brigade suffers physically and materially, for the others must do the work of the absent person in addition to their own. The subcontractors are also affected by this. If a steel worker has not appeared for work it is reflected in the work of the brigade of the forge and press shop, and because of "covering" the job of the absentee, the brigade which produces billets will send out products that are not of high quality, and they will go to the mill operators . . .

I must say that the workers support us in this issue.

The goal toward which we are striving is this: the sum of the plans of the brigade should comprise the shop plan, and the sum of the shop plans -- the plan for the plant. Of course, every production worker will agree with me when I say that it is not at all simple to do this. Sometimes it is necessary to adjust the brigade plan, for frequently it is not only internal factors that affect the rates of its work. But we permit such adjustments extremely rarely, and only after thorough consideration. We think that the experiment in expanding the economic independence of industrial enterprises, which is being conducted particularly in our ministry, should contribute to the adoption of more difficult counterplans by the brigades. This experiment stipulates that the bonus must be directly dependent on the difficulty of the plan.

We provide incentive for economizing on material and energy resources by increasing the bonuses for the coefficient of participation in savings (KEU). This coefficient reflects the personal contribution of each worker to the overall economy. The bonus is calculated in proportion to the KEU and the actual amount of time worked, depending on the sum of the overall savings, with mandatory fulfillment of all khozraschet indicators by the section or brigade. The level of deductions into the material incentive fund for bonuses for economizing on material and energy resources depends on the amount of the funds that were saved and ranges from 3 to 50 percent of the savings. Each year the plant's workers are paid up to 100,000 rubles from this fund.



## The Brigade Contract

The measures described above have enabled us to change over to the brigade contract. To do this, an agreement-contract was concluded between the Marten furnace section, the administration of the shaped steel smelting shop and the division for material and technical supply. According to this agreement, each of the parties has made specific commitments. Thus the collective of the section has made a commitment to fulfill the planned volumes of work on time and in the established list of jobs, precisely in keeping with technical specifications and within the limits of the estimated cost, to reduce production costs, to economize on specific kinds of resources, and so forth.

The shop administration and the supply division, in turn, have given a guarantee to promptly supply the work sections with technical specifications, equipment and mechanisms that are in good repair, and also material, labor and financial resources according to the normatives adopted for the plant.

The material incentives for the collective to save on resources are paid in excess of the established amounts of the bonuses and in excess of the wage fund, regardless of the results of the shop's overall economic activity. Additionally, no less than 85 percent of the overall sum of the bonuses is used for awarding bonuses to workers, and up to 15 percent for awarding bonuses to engineering and technical personnel of the shop and division who are participating in the brigade contract.

The introduction of the brigade contract in the Marten furnace section of the shaped steel smelting shop (144 workers) made it possible to reduce the expenditure of iron by more than 100 kilograms per ton of steel and to increase labor productivity by 7 percent with excellent quality of the work.

Let us give an example of calculating wages for comprehensive all-around brigades working on 2,500- and 1,000-ton presses under a brigade contract. The calculation is made from the individual total rates of all occupations included in the comprehensive all-around brigade, and payment is to be made only for high-quality forging. The bonus is calculated from the wage fund according to the results of the work of the brigade for the month in the following amounts.

For fulfillment of the planning production assignment by 100 percent, the bonus is 30 percent of the piece-rate earnings.

Moreover, for early fulfillment of the plan there is a 2-percent bonus for every tenth of a percentage point in excess of 100 percent. Moreover, the maximum amount of the bonus for brigades of forge operators on 2,500- and 1,000-ton presses does not exceed 40 percent of the piece-rate earnings.

The maximum amount of the bonuses for crane operators, heating furnace workers and operations controllers should not exceed 35 percent of the piece-rate earnings, and for the 1,000-ton press the maximum amount of the bonuses for workers in these occupation should not exceed 38 percent of the piece-rate earnings.

But I must say that the dissemination of the brigade contract is being largely impeded by the material and technical supply. On the basis of the nature of our production, the load on the capacities of the enterprise should be determined for the year before the planning period. In November 1983 we were underloaded by 1,500 tons of rolling equipment, which amounts to 10 percent of the overall load. Why did this happen? Because Soyuzmetallurgkomplekt removed from the preliminary sets of rolled metal equipment for 1984 the batch-type roller hearth furnace (480 tons) for the Magnitogorsk metallurgical combine, the installation of the box furnace (170 tons) for the electro-metallurgical combine (Elektrostal') and a box heating furnace (185 tons) for the Chelyabinsk metallurgical plant. And this list could be continued. Items like this are removed from the list mainly because questions of financing have not been settled. But, still, knowing the reason does not make it any easier for the enterprise. The main thing is that the quality of the preparation of production suffers. How can one speak of 100-percent fulfillment of orders in this situation? And yet there is still another important task -- to provide for the brigades of machine tool workers who are working on khozraschet and the brigade contract. After all, we have signed an agreement.

We hope that a good deal will be set straight by the changeover to the new economic experiment for expanding economic independence. One of the most important points it suggests is to instruct the USSR Gosplan and Gossnab to grant the managers of production associations and enterprises the right, with the participation of the clients, to establish deadlines for the manufacture and delivery of products for which orders are given without normative time periods. Advance deliveries are prohibited: "To establish that the development and approval of annual plans for the production of products, planned distribution of products and the delivery of funds for material and technical resources for production associations and enterprises of the Ministry of Heavy and Transport Machine Building are carried out within time periods which make it unnecessary to give advances for products and which provide for the issuance of orders for planned assignment by the USSR Gossnab for their delivery no later than 2 months before the beginning of the planned year." If this is done it will be possible to speak of firm support, of firm indicators and of true khozraschet. But so far the problem remains.

#### Khozraschet Relations Among Subdivisions

When organizing khozraschet we strove to combine material interest in the results of the labor of the individual and the collective as a whole with material responsibility for the results of production and economic activity. This principle is realized in the plant through khozraschet relations among subdivisions. According to the standard that was introduced at the plant, "Rules for Documenting Mutual Khozraschet Complaints of Plant Subdivisions. Classifier of Khozraschet Complaints. Amounts of 'Sanctions'," each shop (division) must submit khozraschet complaints to the subdivision which has caused its material losses. The sums of the intraplant complaints are taken into account when determining the results of the economic activity of the shops as additional expenditures on production and are included in the balance for the khozraschet production cost of the products produced by the guilty shop.

For example, if the plant's forge and press shop has by way of cooperation delivered billets with increased tolerances or deviations in quality to the mechanics shop, the latter submits a khozraschet complaint. As a result, the khozraschet production cost in the forge and press shop is increased by the amount of the additional expenditures of the mechanics shop (increased labor expenditures for processing the forged piece). In 1982 alone, the forge and press shop received from the mechanics shops complaints totaling more than 16,000 rubles. It, in turn, applied sanctions against the shaped steel smelting shop for a total of about 4,000 rubles, and this shop submitted complaints against the head energy engineer's division for a sum of more than 2,000 rubles for unsatisfactory operation of the power equipment. Thus a causal connection is established between the final results of the labor and the level of organization of production, which makes it possible for plant specialists to eliminate shortcomings on the spot. Moreover, the amount of the actual production cost, taking into account the additional expenditures (recognized khozraschet complaints) is one of the most important indicators for determining the amount of the bonus for the shop collective. Therefore there is a natural desire on the part of its workers to reduce these expenditures, and this means to meet its commitments to other collectives. Establishing the commitments for supplying subcontractors makes it possible to establish khozraschet relations among the shops, and within the shop -- among the brigades. If they do not fulfill the delivery plan, they bear khozraschet responsibility. But it might turn out that the subdivision achieves the khozraschet production cost just as a result of additional payments. Certain people are beginning to abuse the fines. We have introduced a restriction: the rates of reduction of material expenditures should also be reflected in the bookkeeping production cost. If this is not the case, the bonus should be reduced by half.

The DZMO has accumulated a certain amount of experience in working with brigades. But our research in this area is still far from complete. The plant has become the base enterprise in the oblast within the framework of complex system of quality control and effective utilization of resources (KS UKP i EIR) for disseminating brigade forms of labor organization. The work for increasing the effectiveness of the brigades is continuing.

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## MENDELEYEV'S LEGACY TO SCIENCE EXAMINED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 79-84

[Article by G. K. Boreskov, academician, director of the Institute of Catalysis of the Siberian Branch of the USSR Academy of Sciences, Hero of Socialist Labor, and G. S. Yablonskiy, candidate of technical sciences (Novosibirsk): "Following the Traditions of the Scientist"]

[Text] [Editorial Introduction] D. I. Mendeleev, the Russian scientific genius, was born 150 years ago. He coordinated his scientific activity closely with practice, with the crucial tasks of the country's industrial advancement and with the needs of the population. He devoted a good deal of effort to the study of Russia's natural wealth, ways of industrial assimilation of it, the distribution and specialization of production, and efficient organization of interbranch ties. As a result, D. I. Mendeleev became one of the world's eminent economists, who made an essential contribution to the discussion of the crucial problems of the development of the national economy.

D. I. Mendeleev was linked to Siberia by special bonds. He was born here, in the city of Tobolsk. He was able to do a great deal for the development of Siberia by taking advantage of his authority as a scholar with a name known throughout the world. In his works he wrote about the great future of Siberia.

Not all that D. I. Mendeleev wrote about could be realized in prerevolutionary Russia, but his progressive tendencies have been supported on a new basis and developed in our time. "My optimism," the scholar wrote sagaciously, "originated in my study of science, and I would like to instill it in everyone who thirsts to drink from this spring, for all that has been achieved and gives true tranquillity amidst the restless ocean of life."



To celebrate the anniversary of this great Russian patriot, the editors are publishing a selection of materials prepared with the participation of the weekly NAUKA V SIBIRI (Novosibirsk).

The lifelong desire of D. I. Mendeleev was the flourishing of Russia and Russian science. And to accomplish this he thought that it was necessary above all to assimilate her immense expanses, which was to be done on a scientific basis. "Russia should move toward the east, to Siberia" -- such was the thesis of Mendeleev's final work, "Toward Recognition of Russia."

Today we are witnesses to the "chemical discovery" of Siberia. Large-scale industry has been created. It includes the petrochemical complexes of Omsk, Tomsk and Tobolsk, Mendeleev's native city, the electro-chemical productions of Irkutsk Oblast and Krasnoyarsk Kray, and the combine of Kemerovo. In the next few years there is to be marked progress in coal chemistry, primarily on the basis of the colossal supplies of the Kansk-Achinsk deposits and Kuzbass.

What we still need to do is many times greater than what has already been done. This is precisely why we must assimilate the methodological legacy of this most eminent Russian chemist and learn the lessons of the scientist. What do they consist of?

Above all -- systematized interpretation of the facts. The summit of Mendeleev's work is his periodic law, which is the core of modern chemistry. This was preceded by a gigantic amount of classification work. And today, too, an equally immense significance is attached to the gathering and classification of experimental data.

"Clear definition" with respect to industry. By "clear definition" Mendeleev meant constant concern for the applications of the fundamentals of chemical science. Mendeleev's strength as a chemist and technologist consists in his reliance on a solid foundation of theory.

Mendeleev's periodic table is now widely used when searching for catalysts for the chemical industry. A correlation of the catalytic properties of the elements with their positions within the groups of elements frequently serves as an instrument for this search. In Mendeleev's time the essence of catalysis, the basic means of carrying out chemical transformations in industry, was not at all clear. The scientist's words serve as evidence of his extremely profound intuition: "... one must not think that a catalyst remains the same on its contact surface as it was when it was not a part of a reaction." The theory of catalysis followed the path of clarification of the complex chemical interaction between the catalyst and the reagent.

The Institute of Catalysis of the Siberian Branch of the USSR Academy of Sciences has developed theoretical concepts which reflect the influence of the reacting environment on the catalyst: the latter can undergo fairly profound structural changes. It is precisely on the basis of these that they have discovered and essentially improved catalysts for a number of industrially important processes.

The selection of the "main technological job." Dmitriy Ivanovich called the main technological job the undertaking to which basic attention should be devoted. He considered this to be the petroleum business. Having penetrated deeply into the essence of the matter, the scientist went around to all of the largest petroleum industries of his time and wrote a book: "The Petroleum Industry in the North American State of Pennsylvania and in the Caucasus." It was Mendeleyev who said that to heat with petroleum is the same thing as heating with paper money.

We frequently quote this phrase, but we are especially keenly aware of how important it is now that the search for new sources of energy has become a matter of primary importance. Western Siberia is an area of petroleum, but its resources are not unlimited. We must, on the one hand, develop petrochemistry, mainly on the basis of catalysis, and, on the other hand, solve an extremely important problem -- obtaining liquid fuel from coal by catalytic methods as well. Chemical institutes of Siberia are now working on this problem: the Institute of Catalysis, the Institute of Chemistry and Chemical Technology, and the Institute of Coal of the Siberian Branch of the USSR Academy of Sciences. Results suitable for technological utilization have been obtained.

The selection of new technological decisions. D. I. Mendeleyev is the author of a number of principally new technological ideas, particularly ideas for the underground gasification of coal and thermal pyrolysis of petroleum. The scientist also created a smokeless powder. Certain of Mendeleyev's ideas were far ahead of their time.

Today chemists, following Mendeleyev's traditions, are advancing important technological ideas and are realizing them. The practice of Siberian chemistry provides quite a few examples of this. The Institute of Catalysis of the Siberian Branch of the USSR Academy of Sciences has created technology which has no analogues, which presupposes a nonstationary change in conditions in time. It is already being used to obtain sulfuric acid from a gas mixture with a low content of  $\text{SO}_2$ . This technology will undoubtedly be widely used in other processes as well -- the synthesis of methanol, ammonium and others. It is of special interest from an ecological standpoint (the utilization of discharge gases from ferrous and nonferrous metallurgy in order to obtain high-potential heat). This same institute has developed catalytic heat generators (KGT) in which catalysis is applied in the processes of fuel combustion. KGT's will make it possible to reduce the temperature of combustion from 1,200-1,600 degrees in modern fuel jet furnaces to 400-700 degrees and to operate with a minimum surplus of air, which will preclude the formation of harmful substances. The coefficient of fuel utilization also increases sharply. KGT's can be used for thermal processing, dispersion and activation of solid materials; adsorption-contact drying of grain, and many other processes.

The Institute of Inorganic Chemistry of the Siberian Branch of the USSR Academy of Sciences has achieved success in improving materials for solid-state technical equipment and has developed an original method of obtaining superpure metal antimony in which the impurity content is much lower than in the best specimens of domestic brands.

The Institute of Chemistry of Solids and Processing of Mineral Raw Material of the Siberian Branch of the USSR Academy of Sciences has solved some important technological problems: mechanico-chemical processing of phosphate raw material into phosphorus fertilizers, extraction of rare metals from natural thermal waters, and obtaining patterned metal coatings on dielectrics.

The Irkutsk Institute of Organic Chemistry of the Siberian Branch of the USSR Academy of Sciences has synthesized new biologically active organic silicon compounds which are the basis for the creation of pharmaceuticals which accelerate the healing of wounds and burns, stimulate the growth of wool on animals, and so forth.

The idea of the unification of sciences. Circumstances turned out so that Dmitriy Ivanovich Mendeleev was not an academician of the Russian Academy of Sciences (only a corresponding member of it). But, figuratively speaking, in Russia of that time there were two academies: the Academy itself and Mendeleev. One is impressed by the breadth of the scientist's interests. For Mendeleev science was an integrated edifice which has a plan and harmony. "A chemist who is not also a physicist is nothing" -- he loved to repeat the words of the German chemist Bunsen. In the last years of his life Mendeleev himself was proud of the fact that he was able to master Chebyshev's mathematical method, which many mathematicians were unable to do.

The interaction among sciences is one of the principles to which the Siberian Branch of the USSR Academy of Sciences has been adhering since the day it was founded. The Siberian Branch of the USSR Academy of Sciences has a high art of conducting work in the area of detailed mechanisms of complex reactions by modern methods from physics. In the Institute of Chemical Kinetics and Combustion they are actively investigating magnetic and spin-wave effects in chemical reactions. Three phenomena are being studied: the effects of a magnetic field on radical reactions, the magnetic isotopic effect and chemical polarization of nuclei. (And two of these were discovered in this very institute.) The magnetic isotopic effect that has been discovered could be used as a basis for a new principle of division of isotopes, which is based on distinguishing their magnetic properties.

Electronic computers are being introduced more and more extensively in institutes of the Siberian Branch of the Academy of Sciences. In 1971, on the initiative of the Novosibirsk Institute of Organic Chemistry, a scientific information center for molecular spectroscopy was organized. Within its framework a specialized library for spectral information was organized. It has a unique collection of catalogs and card files on various kinds of spectroscopy of molecules. Computers are used to construct quantum-chemical models and industrial reactors; they are necessary for conducting and interpreting modern experiments. It was in the Siberian Branch in the 1960's that they began mathematical modeling of chemical processes -- a new area of theoretical chemistry which makes it possible to shorten the path from laboratory tests to industrial reactors.

. . . A universal mind capable of systematizing an immense totality of facts, of advancing large generalizing concepts and of solving the most important technological problems -- such is the figure of the scientist which comes to us. Siberian chemists bow their heads before the memory of their great compatriot.

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#### MENDELEYEV'S SCHOLARLY ACTIVITIES IN SIBERIA RELATED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 85-92

[Article by L. M. Goryushkin, doctor of historical sciences, professor, Institute of History, Philology and Philosophy of the Siberian Branch of the USSR Academy of Sciences (Novosibirsk): "A Great Siberian"]

[Text] A Native of Tobolsk

On 27 January (8 February new style) 1834 the seventeenth child was born into the family of the director of the Tobolsk gymnasium, I. P. Mendeleyev. This was his son, Dmitriy, who was destined to become the pride of Russia. In that same year Ivan Pavlovich went blind, and after long but unsuccessful treatment he was forced to leave his job. The brother of Dmitriy's mother, V. D. Kornil'yev, saved the Mendeleyevs from poverty. He gave his sister power of attorney to manage a glass plant which belonged to him in the village of Aremzyanskiy, 25 versts from Tobolsk. Recalling his childhood, Dmitriy Ivanovich wrote: "... in the glass plant managed by my mother I received my first impressions from nature, from people and from industrial business." It was apparently here that the boy developed an interest in natural sciences and chemistry. At the age of 7 he went to study in the Tobolsk gymnasium.

Many interesting people visited the Mendeleyev home. Legends about the campaigns of Yermak, meetings with exiled Decembrists, stories from the teacher of P. P. Yershov, the author of the fairy tale "The Hunch-Backed Horse," and stories about meetings with A. S. Pushkin excited the imagination of the young gymnasium student and aroused patriotic feelings.

After his father's death, his mother took her son to Moscow to enroll him in the university. But Dmitriy did not succeed in entering there. Only a year later he was accepted in the natural sciences and mathematics department of the Main Pedagogical Institute of Petersburg. During the first year one misfortune after another befell him. His mother died; his uncle, Kornil'yev, who had helped the Mendeleyev family a great deal, died suddenly; and his sister Yelizaveta died of tuberculosis. And a little while after all this, the 16-year-old boy himself fell seriously ill. He began to bleed profusely from the throat. The doctors discovered tuberculosis and considered him as good as dead.

Although exhausted by his long illness, Dmitriy Ivanovich still completed the institute brilliantly and on the advice of his physician he traveled to Simferopol' to take a job as a teacher in a gymnasium. The doctor assured him that the therapeutic climate of the Crimea would prolong his life. An unexpected meeting with the famous Russian physician N.I. Pirogov had an influence on all the rest of Mendeleyev's life. Having examined the patient carefully, Pirogov firmly convinced Dmitriy Ivanovich that he did not have tuberculosis, but a heart defect that was not dangerous. And the bleeding was a consequence of this. Having taken the prescribed course of treatment, Mendeleyev felt an influx of energy, his spirits rose, and he plunged into science.

At 22 Dmitriy Ivanovich defended his master's dissertation, and a couple of years later he defended his doctoral dissertation and became a professor. His subsequent destiny turned out in such a way that he spent almost all the rest of his life in Petersburg, and only in his declining years did he visit Tobolsk and the village of Aremzyanskiy. He would recall very warmly: "And here lived the respected Decembrists: Fonvizin, Annenkov here, Murav'yev there. They were close to our family after one of the Decembrists, N. V. Basargin, married my sister, the widow Ol'ga Ivanovna. None of them are alive any more, and now one can say that the families of the Decembrists added a special imprint to Tobolsk life at that time, and endowed it with bright recollections. Legends about them survive in Tobolsk to this day." All his life Mendeleyev was proud that he was a Siberian, and he loved to emphasize this: "I myself am a native Siberian, that is, I come from Asiatic Russia, and I even think that in the future Asiatic Russia is destined to play no small role in the world."

#### To the Wealth of Siberia and the Arctic Ocean

Mendeleyev embraced and developed the brilliant prediction of M. V. Lomonosov: "Russian might will grow through Siberia and the Arctic Ocean."

He thought that the assimilation of Siberia should begin precisely with the mastering the Arctic Ocean and reaching the North Pole. And he emphasized that "among the multitude of peaceful causes facing Russia, she should not forget about the peaceful victory over the Polar ice." In conjunction with the eminent Russian naval leader and scientist, Admiral S. O. Makarov, Mendeleyev developed the design for the ice breaker Yermak and participated in its construction. An expedition was to have reached the North Pole on the Yermak. But for a number of reasons this was not accomplished, and the work for assimilating the northern sea route proceeded slowly.

Years later Dmitriy Ivanovich wrote: "Russia has so many shores of the Arctic Ocean that it would be fair to say that our country lies on the banks of this ocean. My personal wishes amount to having us try to master it as completely and quickly as possible, first by reaching the North Pole, which mankind has tried to conquer for so long and so unsuccessfully, and then through correct trade traffic . . . If we break through the stronghold of the mountains, we then have to do battle with the ice, and we have more of it than anybody else.

But around these ice masses is a good deal . . . of wealth . . . of all kinds, our own America. I would be glad to die there, at the Pole -- at least I would not rot."

Speaking of the development of Russia's economy at the very beginning of the 20th century, Mendeleev raised the question of the creation of industry in Northern Siberia. In the opinion of the scientist, the north was destined to remain almost deserted for a long time, that is, to have only sparse population, because it is not very suitable for Russians who have become accustomed to starting villages by cultivating the land for grain. Only the development of mineral wealth excavation could change this state of affairs in the next epoch. Dmitriy Ivanovich insisted on the need for systematic prospecting work throughout the Russian north.

D. I. Mendeleev also linked the utilization of the wealth of the northern outskirts to industry in the Urals. In a memorandum to the minister of finance, S.Yu. Vitte, he wrote: "Russia's industrial influence on all of Western Siberia and the steppe part of Asia can and should take place through the Ural area, which constitutes the true boundary between Europe and Asia."

Firmly convinced of the existence of invaluable mineral deposits in Siberia, he predicted the rapid growth of the coal and metallurgical industry there: "... that inexhaustible wealth of rock coal deposits which are known to exist around Kuznetsk will in time serve the rapid development of metallurgical and all other kinds of factory and plant activity there, especially because of the wealth of Altay ore."

Studying the economy of Siberia, Mendeleev drew attention to the poor condition of transportation and railroads. The Tyumen branch of the Ural railroad and the Transsiberian mainline had inadequate handling capacity and did not fully provide for the delivery of all of the growing flow of various kinds of cargo. Traveling along the Siberian rivers, the steamships which were slow and had little power could not keep up with the shipments in the Ob' and Irtysh basin. Mendeleev developed a plan for the construction of railroads in Siberia. He attached special importance to the construction of the Tobolsk railroad: "... I consider the joining of Tobolsk with the network of Russian railroads to be a primary and a real way of bringing life into all of Western Siberia and easing the already overloaded part of the Great Siberian railroad, and also for enlivening Ural metallurgy, and therefore I make bold to recommend that this road be given priority."

The scientist devoted a great deal of attention to questions of population. Carefully analyzing all of the economic, geographical and climatic data, he came to the conclusion that the center of the population in Russia, which, according to the 1897 census, was in Tambov province, would in time shift to the east and would be at the coordinates of about 56 degrees north latitude and about 46 degrees east longitude, on the border between Tobolsk and Tomsk provinces, north of the city of Omsk. Mendeleev expressed the idea of the need for more rapid assimilation of the Far East, suggesting "in no way putting it off and sparing no money, first of all to bring in everything necessary for building ships, beginning with rock coal mines, iron smelting

furnaces, finishing plants and wharves, knowing that people would come here of their own accord if only there were work and the earnings were steady."

### Combining Training and Science

D. I. Mendeleyev did a good deal for the development of higher education in Russia. Defining the goals and tasks of the higher school, he wrote: "... the contribution of public funds to the cause of higher education can be considered fruitful, however, only if these still new institutions will not only educate the throngs of students, but will begin to develop the corresponding practical knowledge, that is, if they begin to develop professors, assistants, and laboratory assistants and, with the help of the students, new branches and areas of knowledge." He was also in favor of the higher school, which would produce people capable of developing the economy and advancing Russian science. The scientist thought it was possible to assimilate the natural wealth of Siberia only if specialists were trained who could be in charge primarily of mining and geological work.

When in the capital they resolved the question of creating a university in Siberia -- the first higher educational institution in this area -- Dmitriy Ivanovich supported the Siberians with his authority and was a member of the commission. Through his knowledge and experience he rendered a great deal of assistance in developing the plan for the university, outfitting and equipping its offices and laboratories, and selecting the staff of professors. This was difficult, for the majority of scientists categorically refused to move to the distant and cold Siberia. One of the first professors of physics to come to the Tomsk university was a relative of Dmitriy Ivanovich -- a master of physics, Fedor Yakovlevich Kapustin, who traded the brilliant career that was opening up for him in the capital university for service to his native Siberia.

As we know, Tomsk University was opened only as a medical department and was actually a higher medical school. Dmitriy Ivanovich suggested adding a physics and mathematics department to Tomsk University with an engineering division as part of it. But the Ministry of Public Education rejected Mendeleyev's suggestion, considering that there was no precedent for this either in Russia or anywhere else in the world. Moreover, according to the concepts of that time, mixing pure science, which was taught in universities, with applied knowledge, which was the realm of technical VUZes, was impossible.

In the second half of the 1890's traffic began on the Siberian Railroad. But only about 2 percent of its management staff had a higher education. In addition to everything else, it was necessary to begin immediately to train engineers and specialists who were capable of prospecting for deposits of rock coal and to arrange for the mining of it in quantities necessary for the railroad. At this point Siberia was shipping in fuel for the steam engines from the Donbass.

In order to discuss the question of organizing a higher technical school in Siberia, a special commission was created under the Ministry of Public Education which included the leading scientists of Russia. Mendeleyev was not



included on it at first since he was serving in the Chamber of Weights and Measures, which was under a different department. But soon the minister of education, I. D. Delyanov, considering the opinions of the other scientists, was forced to invite him.

Dmitriy Ivanovich could not attend the first meeting because of illness. "And since, being a Siberian, I wanted to help as much as I could with the task assigned to the commission," he wrote to the chairman of the commission, Professor Lyubinov, "I shall try, if you will allow me, to present my best judgment in writing as soon as I find out about the issues that are to be considered; the main thing that is not clear to me from the incomplete information I have heard is the following: is it suggested that we discuss all at once the building in Tomsk of both a physical and mathematics institute under the university and a special technical institute, or to make a choice of one of the two aforementioned institutions ... In general, because of my bad health, I am willing to write more than I can say -- it is difficult for me to speak and I am to avoid long conversations."

Subsequently, Professor Lyubimov regularly sent a courier to Dmitriy Ivanovich with the minutes of the commission meeting. Mendeleyev familiarized himself with them and wrote his remarks regarding the questions that were being considered, and then members of the commission read Dmitriy Ivanovich's suggestions. After lengthy work, the commission developed a plan for establishing the Tomsk technical institute, which was to consist of two divisions: mechanical and chemico-technological. In the chemical division considerable space was allotted to metallurgy of ferrous and nonferrous metals, and also the processing of agricultural products, which was of immense significance for Siberia as a colonized farming area.

The plan, which was approved on 14 March 1896 by the State Council, and on 29 April (Old Style) by the tsar, acquired the force of law. The construction of the buildings began in Tomsk in the summer of that same year. But the mechanics and chemico-technological divisions of the institute could not satisfy the area's needs for specialists. Siberia needed mining engineers and construction engineers. Mendeleyev helped to develop a plan for expanding the Tomsk Technological Institute which had not been opened yet and contributed to its favorable consideration by the higher-ups. On 12 June 1900 the State Council adopted a decision to open in the Tomsk Technological Institute mining and engineering construction divisions in addition to the divisions that had already been approved.

Dmitriy Ivanovich participated in the organization of the chemical division -- he selected talented scientists and young associates who inspired hope, and the majority of them subsequently became eminent scientists. Of the first four professors of the Tomsk Technological Institute, three were professors of chemistry: Ye. L. Zubashev, N. M. Kizhner and D. P. Turbaba. He also helped in equipping the laboratories and offices, which made it possible even in the first years to develop in the institute large-scale research in various areas of science.

## An Honorary Member of the First Siberian VUZes

From the time of the opening of the Tomsk Technological Institute until the very end Dmitriy Ivanovich maintained close ties with many scientists of the VUZ. He was especially close friends with Doctor of Chemistry D. P. Turbaba. On 10 January 1904 Dmitriy Petrovich submitted to the director of the Tomsk Technological Institute a report with a request that they raise at the next meeting the question of making Dmitriy Ivanovich Mendeleyev an honorary member of the Tomsk Technological Institute. Then he gave a report at the council meeting. In the resolution it is written: "... by a decree of 22 January 1904, the renowned Russian scientist, a native of Siberia, the leader of the main board of the Chamber of Weights and Measures, a privy counselor and a professor, Dmitriy Ivanovich Mendeleyev, was elected an honorary member of the institute." It was also decreed that a portrait of Dmitriy Ivanovich be ordered and hung in the large chemistry auditorium of the chemistry building, and later a bust of D. I. Mendeleyev was to be placed in the hall of the institute. Dmitriy Ivanovich, who was 70 years old by now, was notified of this by a telegram.

During those days the entire country was welcoming its great son, and the Mendeleyev's apartment was flooded with notes, telegrams and letters. Mendeleyev himself was seriously ill, he had undergone a complicated operation on his eye, and he could neither read nor write. But Dmitriy Ivanovich did not leave the congratulations of his fellow countrymen unanswered. They read his letter at a meeting of the institute's council: "The great honor and the warm greeting of the Tomsk Technological Institute touched me to the depth of my soul as a native Siberian. With all my heart I thank you and ask you to express my gratitude to members of the council of the institute ... Sincerely yours (signed) D. Mendeleyev." The letter, which contains the great scientist's autograph, is kept to this day in the library of the Tomsk Polytechnical (previously Technological) Institute in the archives of rare books and manuscripts.

The teacher Zakhariy Alekseyevich Rokachevskiy was asked to paint a portrait of the famous Siberian. The son of a minor railroad official and the nephew of the famous sculptor and artist Mikeshein, Zakhariy Alekseyevich studied in the Academy of Arts and received a diploma of class artist, and then, having completed 2 years of courses in architecture, he also received an architecture diploma. In the institute, he taught drawing and the theory of perspective in the construction engineering division. In the Academy of Arts Rokachevskiy studied for several years with Mendeleyev's wife, Anna Ivanovna. He frequently encountered Dmitriy Ivanovich there as well, who had been elected an honorary member of the Academy of Arts. He remembered him well and was glad to accept the invitation. The portrait was finished in autumn of 1904.

At the request of some Tomsk scientists, Mendeleyev's wife, the artist Anna Ivanovna, began to paint another portrait of Dmitriy Ivanovich. She painted it carefully, trying to convey his main features. Wishing to know the public's opinion of her work, Anna Ivanovna exhibited the portrait for general viewing in the Society for Encouragement of the Arts in Petersburg. The work was given a high rating. The portrait was sent to Tomsk and hung in the technological institute where it remains to this day.

D. I. Mendeleev was also elected an honorary member of Tomsk University. Several years later, after her husband was already dead, Anna Ivanovna painted another portrait of Mendeleev and presented it as a gift to Prof. A. A. Kulyabko. For a long time it remained in the private collection of Aleksey Aleksandrovich. When he moved to Moscow, the professor donated his collection of books and paintings to the library of the Tomsk University.

The Tomsk Technological Institute and the Tomsk University regularly sent printed scientific workers to Petersburg to their honorary member, D. I. Mendeleev. Up to this time they are stored in Dmitriy Ivanovich's private library, which is located in the Mendeleev Museum at Leningrad University.

The leading scientists of the Tomsk Technological Institute and Tomsk University participated in the creation of the Mendeleev Society and have also taken part in all the society's congresses in recent years. Many scientific conferences held in Tomsk have been dedicated to the memory of Dmitriy Ivanovich Mendeleev. Numerous students of his from other cities have spoken at these.

Dmitriy Ivanovich died on 2 February 1907 of a pulmonary inflammation, just a couple of days before his 73rd birthday. Three-quarters of a century had passed. During the years of Soviet power Siberia had been transformed into an area of mighty industry and highly developed science and culture. Many of the ideas and plans of the great scientist have already been realized. There has been a confirmation of Mendeleev's predictions that there is invaluable wealth along the shores of the Arctic Ocean and that Northern Siberia conceals immense deposits of minerals. Some of these deposits have not only been discovered, but are now being used for the good of the people.

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## D. I. MENDELEYEV'S ECONOMIC WORKS REVIEWED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 93-98

[Article by A. P. Leont'yev, candidate of economic sciences (Novosibirsk): "Prospects for the Industrial Development of Russia"]

[Text] D. I. Mendeleev investigated a broad group of applied problems related to the economic development of Russia. The overall volume of his economic legacy reaches 200 printed pages. The application of chemistry in the national economy, the program for the development of the petroleum industry (from improving drilling techniques to entering the world market), the idea of underground gasification of coal, the assimilation of the Kuznets Basin and other regions of Siberia and the Far East, the significance of the Arctic Ocean, the harmonious combination of industry and agriculture -- the in-depth study of these and other problems enabled the great creator of the periodic table of chemical elements to occupy an eminent position in the history of Russian economic thought, and to suggest means and solutions which have been corroborated by life. He dreamed of Russia's reaching advanced industrial goals, he created conditions for public education, and he saw in the successes of science and technology a most important source for accelerated development of production.

Let us recall the basic ideas and the themes of the most important economic works of D. I. Mendeleev in their chronological order.

1868. "On Current Development of Certain Chemical Industries as Applied to Russia, and the World Exhibition of 1867." The author raised for the first time the question of extensive utilization of the country's natural resources for creating a chemical industry. He predicted a great future for this.

1877. "The Petroleum Industry in the North American State of Pennsylvania and in the Caucasus." The author set as his goal to draw more attention to the petroleum business, to point out how it has developed in North America and the Caucasus, to take note of those circumstances which have impeded our petroleum industry which was begun before the American industry was, and to occupy the appropriate position in it. The book was written as a result of the author's personal acquaintance with the state of affairs in Pennsylvania and the Caucasus.



1881. "Where to Build Oil Refineries?" The author pointed out the real possibilities of more efficient and economically advantageous organization of the extraction, transportation and processing of Baku petroleum. He protested against the one-sided drive for increasing the extraction of petroleum without solving the problems of its utilization.

1882. "On Conditions for the Development of Plant Work in Russia. A Speech at the Industrial Congress in Moscow." The work proved that Russia had sufficient raw material resources, sales possibilities and other conditions necessary for the rapid development of industry. The author came out in favor of separating industry and trade into a special ministry. In his words, it was necessary to separate industrial work from the Ministry of Finance in order for it to be clear to everyone that it was not in order to impose new taxes, but for the direct benefit of the development of the nation that new plants and factories were needed in a quantity that corresponded to the size and resources of Russia. As distinct from the others, the industrial minister must know and understand above all what kind of enterprises should be given special attention and protection at a given time. The development of industry, while it has all the signs of a state affair, is at the same time a matter of the land (that is, local and social). Therefore the development of industry only stands to gain from complete clarity, from the possibility of discussing it completely with complete publicity of prompt printed reports on the information that has been gathered. It should not be made the object of bureaucratic production, as has been done, for example, with all of our mining business. In the bureaucracy it is impossible to invent and in literature it is impossible to glean information about what must especially be kept in mind and what can be done and arranged at a given time with respect to factory and plant activity. And above all in a bureaucracy it is impossible to avoid white-washing and arbitrariness. In conclusion the author expressed a desire: that the scientific undertakings become part of a well-arranged plant business for the good of the people ....

1884. "On Promoting Industrial Development in Russia." Developing the ideas presented in the preceding work, the author wrote that the plants and factories, which are historically necessary, do not grow of their own accord like mushrooms. Awareness is needed, as is a historical understanding, and there must be a sequential connection with the past which is transformed into will, although the necessary beginnings are already prepared and are already being borne by the winds of time. Russia's industrial backwardness has doomed her to poverty and economic dependence.

1885-1886. "Letters About Plants." The author recommended that the readers look for the answers to questions about the development of plant work in life itself. Wrote D. I. Mendeleev: look not only in statistical collections and railroad and customs reports for information on what we are producing, what we need and what is being shipped in from abroad, and also what we can advantageously produce and even export. Learn about this directly from life's relations in those circles which live to some degree not in the abstraction of Russian life, not in dreams about considerations and judgments, but in contact with the practical questions of our country, particularly in contact with the industrial life of the area in which you wish to operate.

1888. "A Primary Need of Russian Industry. A Written Report." In the author's words, the greatest common interests of Russian industry are shelterless. The Ministry of Industry must link them, protect them from random factors and bring them into a system. In order to achieve this, it should be given jurisdiction over mining, plants and factories, rail and other (not national) roads, internal water routes, sea ports, the commercial fleet, and domestic and foreign trade.

1892. "An Intelligible Tariff or Investigation of the Development of Russian Industry in Connection with the General Customs Tariff of 1891." F. Engels read this work in 1892 and gave it a high evaluation in his letter to N. F. Daniyel'son (see K. Marx and F. Engels, "Works," Vol 38, p 266). The author supported the introduction of a protective tariff which would protect the interests of domestic industry. In his words, for the good of Russia, and through it for the good of all mankind, one must wish that the roots of all enlightened modern world development, that is, industry in the modern sense, would be planted and would flourish in the fertile Russian soil. The soil itself is fresh and fertile. The need and demand for a mass of new labor is obvious to everyone. Not to work means not to produce anything useful from what was previously useless, to lie around doing nothing, to have random hopes and to justify oneself in everything.

1897. "Justification of Protectionism." Defending the need for state support of Russian industry, the author included in the concept of protectionism a large group of measures. In his words, the country's industrial and trade policy cannot be correctly understood if one takes it to mean only customs duties. D. I. Mendeleyev included in the concept of protectionism the entire totality of state measures that benefit industry and trade and areas related to them, from the schools to the foreign policy, from the roads to the banks, from legal provisions to world exhibitions, from the defense of the land to the speed of shipments.

1899. "Ideas About the Development of the Agricultural Industry." The main idea of the work is the expediency of utilizing in agriculture forms and methods of production that are typical of industry, primarily the achievements of science and technology. Thinking about the future, the author wrote about bringing physical and mental labor closer together. In his words, the modern social organization is approaching the point of actually releasing people from compulsory slave labor and teaching them to engage in productive labor.

1900. "Teachings About Industry." The author demonstrated the idea that modern civilization is based on the development of industry, especially the metallurgical, coal and petroleum industries. D. I. Mendeleyev wrote that the immense growth of all industry in the 19th century is partially explained precisely by the fact that there has been extraordinary advancement in our knowledge of chemistry during this century. Land, as one of the main prerequisites for industry, is limited, but we cannot even envision the limits of knowledge. Therefore industry too, by combining knowledge and the sciences, promises unlimited development.

1900. "The Ural Iron Industry." From the results of a special expedition, the author gave specific answers to the following questions:

1. What is the reason for the slow development of the iron industry in the Ural area?
2. What quantity of iron and iron products can be expected from the Ural area, based on its natural resources, if the processing of ore reaches its most complete possible development there?
3. Can iron products from the Ural area be less expensive, and by how much?
4. What governmental measures can contribute to making iron ore, iron products and steel less expensive in the Ural areas, and to increasing their production?
5. What would then be the significance of Ural plants, mines and forests which belong to the government?

When he had completed his work D. I. Mendeleyev wrote: "A belief in the future of Russia, which has always lived in me, was originated and strengthened by my close familiarity with the Urals, since the future will be determined by economic conditions, and these are energy, knowledge, land, grain, fuel and iron, more than any other kinds of property."

1901. "On the Investigation of the Arctic Ocean. A Written Report." Outlining a program of research of the Arctic Ocean, the author wrote that a victory over the ice there would comprise one of the issues in the future possibilities of the northeastern part of European Russia and almost all of Siberia, since timber, grain and other heavy raw materials from remote areas would have sales routes both within the country and throughout the world just by the sea. To gain a victory over the polar ice was necessary and especially desirable at least as much for the direct industrial advantage of mankind as for the triumph of knowledge.

1904. "Cherished Ideas." This is one of the author's generalizing works on problems of the economic development of Russia. In it, he emphasized the significance of public education for solving all economic problems. Natural sciences, guided only by a love of knowledge, have served and will serve for the direct benefit of people, although the connection is not direct. The author regarded agriculture as a kind of industry -- a deliberate means of artificially obtaining substances which are necessary to people, with the help of the corresponding plants and animals, by contributing to raising them in the required quantity. The freedom of labor, which is greater in industry than it is in agriculture, comprises an essential condition for its productivity and improvement. This freedom is limited by land and capital, that is, by past history, but current history, if it is true, will strive to increase it.

1906. "Toward a Recognition of Russia." This is D. I. Mendeleyev's last work. It was published five times in two years. In it, the author gives a detailed description of the country's economic resources, considers problems

of the assimilation of the Arctic Ocean and the marshy, arid and desert regions of the country, and indicates the possibilities of constructing canals, using solar energy, and so forth. The book has become a kind of last will and testament from the scientist to the people of Russia.

"Science and industry -- these are my dreams," wrote D. I. Mendeleyev in 1905. He was true to these dreams throughout his life. They led D. I. Mendeleyev to a study of economic problems of the industrial advancement of Russia. An analysis of the real tendencies in scientific and technical progress in the basic branches of industry raised the question of the need for large transformations in the national economy. D. I. Mendeleyev did not speak out in favor of a restructuring of social relations in Russia, but his conclusions concerning the paths of development of the productive forces were progressive in nature and they have entered the treasure house of Russian economic thought.

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## METAL-INTENSIVENESS OF MACHINE BUILDING PRODUCTS DISCUSSED

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[Article by V. I. Pavlov, candidate of economic sciences, Scientific Research Institute of Planning and Normatives under the USSR Gosplan, and A. N. Spektor, candidate of technical sciences (Moscow): "Metal-Intensiveness of Machine Building Products: Tendencies and Plans"]

[Text] The course taken by the 25th and 26th CPSU Congresses toward intensification of public production, particularly toward economizing on materials, presupposes an all-around reduction of the material-intensiveness of the machine building, metal processing and construction branches. Of special significance in the country's economy are ferrous metals. Although in value terms they comprise little more than 5 percent of current material expenditures of public production, since they are "one of the foundations of civilization," to use V. I. Lenin's figurative expression, they determine to a considerable degree the possibilities for the development of all material production.

As calculations show, since 1966 there has been a persistent tendency toward reduction of the apparent consumption of ferrous metals per 1 million rubles' worth of produced national income (an average of approximately 2 percent per year). This made it possible (with an increase during that same period of iron and steel smelting in the country -- 1.6 fold, the production of prepared rolled metal -- 1.7 fold, and the production of steel pipes -- 2 fold) to provide for a 2.4-fold increase in the gross social product, a 2.7-fold increase in industrial output (including a 4.5-fold increase in the output of machine-building and metal-processing products), and a 2-fold increase in the volume of construction and installation work. The proportion of products from the machine building and metal processing branches in the overall volume of industrial output, being the main consumers of metal, increased from 16.7 percent in 1965 to 28.7 percent in 1980, and the share of construction products in the gross social product remained at the level of 9.5 percent.

But in a number of cases, the metal-intensiveness of domestic machines and equipment is 15-25 percent higher than that of foreign analogs. For example, the mass-intensiveness of the KB-572A logging truck produced by the Kommunar machine building plant in Perm is 5,360 kilograms per ton of cargo that is

carried, and that of its French analog is 4335 kilograms. The mass of the EO-6121 excavator produced by the Ministry of Construction, Road and Municipal Machine Building is 9 tons greater than that of the analogous foreign model, and that of the KB-405-2 tower crane is 26 tons greater.

The state plans for the 11th Five-Year Plan have set assignments for reducing the metal-intensiveness of products that are considerably higher than those of the 10th Five-Year Plan. Thus in machine building and metal processing, by 1985 the savings on rolled ferrous metals should have amounted to 8.5 million tons as compared to 5.6 million tons in 1980.<sup>2</sup>

For successful fulfillment of the plans for reducing the material-intensiveness of products, in addition to applying a complex of organizational-economic and technical measures, it is necessary, in our opinion, to change over to planning the reduction of the mass and material-intensiveness of machine building products, primarily with respect to the most important kinds of items in series, large-scale and mass production. Now work is being done at all levels of management to contribute to the fulfillment of the centralized assignments for the average reduction of the norms of expenditure of the most important kinds of metal products, increased coefficients of their utilization and a reduction of the overall proportional expenditure of metal.

But the documentation pertaining to the justification by economic and planning agencies for the expenditure of material and technical resources, including metal products, is different among the various services (design, technological, planning-economic, normative, supply and so forth). This makes it less clear and makes it more difficult to check on the weight characteristics of the item as a whole as well as its constituent parts, the structure of metal consumption and the overall level and sources of the formation of losses and wastes of metal; it makes it more difficult to conduct an engineering justification for an evaluation of the effectiveness of the utilization of ferrous and nonferrous metals when producing and using products, and also comparing the metal-intensiveness of machine building products with that of their foreign analogs (taking their consumer qualities into account). There is apparently now a need to develop and introduce into the practice of planning a standard methodological document which makes it possible, on the basis of engineering justification calculations conducted in the ministries, associations and enterprises when developing design, technological and organizational-economic measures, to reveal and make apparent to the central planning and economic agencies the reserves for a possible reduction of the metal-intensiveness of products. Here the indicators which characterize the physical savings on ferrous and nonferrous metals during the production and operation of the product and the reduction of the overall and proportional mass should figure in with the value indicators of material-intensiveness. The replacement of ordinary metal with progressive kinds of metal products, plastics and items made of metallic powders, while leading to a reduction of the weight characteristics of the products, is in many cases accompanied by an increase in the expenditures for the design materials that are used (because of the still existing lack of correspondence between the prices and the real consumer qualities of these materials).

The need for this kind of comprehensive approach to resource conservation can be traced especially clearly from the example of the utilization of powder metallurgy items in automotive construction. Now enterprises of this branch annually manufacture from metal powders up to 250 million items of more than 220 kinds (friction disks, valve guides, pistons and so forth), saving 50 units of metal cutting equipment, 2,000 tons of rolled metal and the labor of 70 workers from the use of every 1,000 tons of these items. Still, because of the extremely high wholesale prices for metal powders, with a ratio to the prices of rolled ferrous metals of 4:1, in many cases enterprises use them at a loss. Thus at the Moscow plant for sets of automotive parts, the manufacture of pistons for the oil pump of the ZIL-130 vehicle from powder, in addition to saving on metal, provided for saving the labor of 10 machine tool operators, reducing the number of units of equipment by 21 and releasing 200 square meters of production space. But because of the extremely high cost of the powder (and since January 1982 it has increased by an average of another 41-42 percent), this measure has caused the plant annual losses in the amount of 340,000 rubles.

Planning more efficient and effective metal consumption includes, in the first place, the development of a complex of sound engineering and mutually coordinated measures directed toward reducing the proportional mass and the industrial metal-intensiveness of machines, mechanisms, instruments and structures and, in the second place, ensuring higher quality indicators of the items, greater reliability and greater durability, which reduces the expenditures of metal on spare parts and repair of the items during operation. Both of these aspects of the work toward economizing on metal in the national economy should be constantly within the field of vision of management workers and planning agencies.

#### Indicators of Mass-Intensiveness and Metal-Intensiveness of Machine Building Products

When planning efficient material consumption in the sphere of production of machine building products, it is expedient to envision reducing the proportional mass of the products and their production metal-intensiveness, and this should be done systematically, preceding the development of annual and five-year plans of the ministries and departments, associations and enterprises. It should encompass both the most important newly developed kinds of specific machines, equipment, instruments and structures, and products that are already being produced, taking into account their metal-intensiveness, production volume, and the planned length of time in which they will be produced.

One should clearly indicate the essence of the planned indicators, since in practice certain concepts are frequently replaced by others. A reduction of the mass-intensiveness of the products is frequently interpreted as a reduction of its absolute design metal-intensiveness, which characterizes the mass of all the totality of components and parts manufactured from metal. The absolute design metal-intensiveness and the mass of the item are not always the same. The former is frequently less than the latter since individual components and parts of a product, including purchased batching items, can be made of other design materials besides metal (plastics, wood plastics,

reinforced concrete, glass, and so forth). The mass of the item, which comprises the mass of all of its components and parts, is clearly controlled according to data from design documentation or the results of weighing, while a determination of the absolute design metal-intensiveness is fraught with considerable difficulties, since under the conditions of broad specialization and cooperation of production, it is extremely difficult to separate the metal parts and components from the mass of the purchased batching items which are manufactured at other enterprises from various design materials.

The indicator of the proportional mass (mass-intensiveness) of the machine building product, which is used for evaluating the progressiveness of the design solution, can be regarded during planning as the ratio between the mass of the item (in its delivery condition) and the magnitude of its basic technological parameter, which reflects most fully the consumer qualities of the product.

With the help of the production indicator for metal-intensiveness of the product, which takes into account both the design and the technological solutions, one can exercise control over the utilization of metal and the evaluation of metal consumption by each fund holder. This indicator, which is comprised of the production-design metal-intensiveness and the metal-intensiveness (mass) of the technological wastes and the losses of metal during the manufacture of items, is the overall expenditure (mass) of metal of a given fund holder per unit of output. It is calculated as the sum of norms for the expenditure of all kinds of consumed ferrous and nonferrous metals, which should have been justified by the corresponding technical and economic calculations carried out on the basis of design and technological documentation. In turn, the design-technological metal-intensiveness of the product is the mass of all prepared parts and components of the item (in the condition in which it is delivered to the consumer) manufactured from the metal of the given fund holder. One should not take into account in the production-design metal-intensiveness the mass of purchased batching items and equipment manufactured from metal which is allotted to other fund holders. This approach is brought about by the fact that the consumer of the purchased items, as a rule, does not exert the necessary influence on reducing their mass and metal-intensiveness. Moreover, batching items can include components and parts made from nonmetal materials (plastics, glass, and so forth).

When planning for economizing on metal, it is expedient to evaluate the reduction of the proportional mass and the production metal-intensiveness of the products that are produced by comparing the corresponding indicators for the planned year and the base year, and with respect to product that are being produced for the first time -- a comparison of the proportional mass of the new item with this same indicator for the best domestic or foreign analogous model. At the same time, for products that are already being produced and those that are just being assimilated by industry, it is necessary to plan the reduction of the expenditure of metal during operation, evaluating it with the help of indicators of the expenditure of metal for repair and spare parts (during the normative service life of the product) per unit of the basic technical parameter of the item (productivity, capacity, and so forth). Reducing the operational metal-intensiveness of the product is a most important direction for economizing on metal since every fifth ton of metal



that is smelted is used for repair of fixed capital, and the annual expenditures for these purposes amount to 40 billion rubles.

#### Methodological Principles for Planning Metal-Intensiveness

The development of plans for reducing the proportional mass and the production and operational metal-intensiveness of the product should be strictly regulated. In the majority of cases a leading and ever increasing role here is being played by planning and design subdivisions and the services associated with them. They are responsible for the depth and level of substantiation of the engineering development when the product is designed, the level of the encompassing of durability and other calculations for the components and parts, the utilization of effective design materials, the main consumer properties and the quality of the product, and the underlying level of unification. Suffice it to say that the proportion of savings on rolled ferrous metals in machine building as the result of improved designs for machines and mechanisms and the application of more progressive kinds of metal products and substitutes for rolled metal has increased from approximately 44 percent under the 8th Five-Year Plan to 67 percent under the 10th.

Planning of the mass-intensiveness and metal-intensiveness of the item as a whole can begin with a differentiation of it into the main components and parts, for which one singles out the main production functions, the conditions and time periods for operation, and, related to this, the type and quality of the materials that are applied, reserves of durability, and technological processes. This is conditioned by the fact that the item as a whole in terms of its consumer effect, mass-intensiveness and material-intensiveness, can correspond to the best world models or even surpass them, but a comparison with them in terms of individual components and parts will make it possible to discover significant reserves for reducing the mass and improving the quality of the products.

At the Kiev Automated Machine Tool Plant imeni M. Gor'kiy, where certification for metal-intensiveness is used extensively, every designed part is considered by the technical council and compared with progressive analogs. Even if the machine as a whole is as good as or surpasses analogous items, in its individual components and parts they frequently find reserves for economizing on metal. In 1981 the plant was able to save more than 500 tons of metal.

The experience in work for reducing the mass and material-intensiveness and improving the consumer qualities of machine building products which was conducted on a large scale in the GDR also proves that it produces good results. At the Takraf combine, which is one of the largest suppliers of lifting-transport and mining equipment to the CEMA countries, they annually conduct technical certification of the products, which includes comparing the item as a whole and all of its parts and components with the best world models (in terms of technical parameters, weight, and materials that are used). Reserves for economizing are revealed, and measures are developed for utilizing these reserves through improvement of the design, the use of better-quality materials, interchangeability of design materials, the introduction of reduced-waste technology and improvement of production. Such a comprehensive evaluation of the design and technology produces a great economic effect. For

example, the use of highly durable and therefore more costly steel for manufacturing booms for cranes turned out to be technically and economically advantageous, since each kilogram of reduction in the weight of the booms reduced the mass of the counterbalance (the cab and the platform). As a result, the proportional mass-intensiveness of the crane that is produced was reduced by 30 percent (from 1.90 to 1.33 tons per ton of lifting capacity).

Thus, the calculations of the reduction in the proportional mass and production-design and operational metal-intensiveness of the products should be carried out both for the item as a whole and for its most important and heaviest components and parts, including individually the main kinds of design materials that are used and also the purchased batching items and equipment. Moreover, in the calculation documentation, which contains data for the current and planned periods, it is necessary to reveal the following indicators for the various kinds of design materials which basically determine the mass of the prepared product (in the majority of cases they include rolled ferrous metals, all kinds of steel pipes, and smelted iron and steel):

their mass and their proportion in percentages of the mass of the item as a whole or of the corresponding part;

the overall number of parts made of the given material with an indicator of the quantity and the overall mass of the borrowed and standardized parts, and also the parts that have been subjected to the corresponding engineering calculations;

their proportion in percentages of the overall mass of the parts of the item (component) made of the given kind of metal product;

the coefficient of unification of the item in terms of the parts manufactured from the corresponding material.

These indicators show fully, clearly and simply enough the progressiveness of the item, and they show the main sources for further reducing the metal-intensiveness of the product. For example, the application of modern calculation methods using computers when designing items, refinement of the coefficients of reserve, and the inclusion of more parts in technical calculations provide for improving the quality and reducing the mass of the items as a result of optimization of their designs, taking into account the technological level of their manufacture. For now, according to data from specialists in the area of standardization, during the design stage calculations are made for the permissible stress and other parameters mainly of the basic parts of the item which determine its reliability during operation, but these usually comprise only 20-30 percent of the overall mass of the product.

The use of computers provides not only for a considerable expansion of the range of parts included in the calculations, but they also make the calculations themselves more thorough, increase the number of variants of development, and place in the hands of the designer the key to the selection of decisions which are technically and economically better grounded. The application in the ZIL association of a system of optimal planning of

components and parts for trucks provides for the required level of metal-intensiveness of the products with a simultaneous increase in their reliability and durability. The utilization of computers equipped with displays for viewing the graphic depiction of the planned component or part makes it possible to reduce the weight of the frames of the trucks by 10 kilograms while increasing the rigidity of the design by 30 percent. Using this method, the ZIL is working out the metal-intensiveness of the beds and bearing structures of trucks and parts for the new ZIL-645 diesel engine.

The changeover to modern methods of planning, naturally, should be accompanied by improvement of the norms, standards and rules for design. In conjunction with the ministries and departments, the Gosstandart has already begun this work, refining in the standards and methodological documents the permissible stress limits, the coefficients of reserve and the methods of testing the product. But there are still not enough of these standards, and the designing of most of the machine building products is not regulated by scientifically substantiated state standards.

When planning a reduction of the metal-intensiveness of products it is expedient to devote special attention to raising the level of unification of components and parts and creating design-unified series of machines, equipment and instruments. In many foreign machine building firms, this is the key factor in making a decision about putting a design into production: a policy has been established whereby the designer usually has the right to submit for production items in which the proportion of unified and normed parts is no less than 75-80 percent.<sup>3</sup>

Of special importance when planning the metal-intensiveness of machine building products is a correct selection of purchased batching items and equipment, which frequently comprise more than 50 percent of the mass of the item or material expenditures on its manufacture. Unfortunately, there is still the opinion among economists that it is impossible to save on batching items, even though the practice of the leading design bureaus and the developments of the state inspection teams of the USSR Gosstab convincingly show that by improving the arrangement of item components, eliminating excess reserves of durability, applying an improved drive, or by realizing new operating principles for the machine and its individual components in the design, it is possible to achieve a marked reduction in expenditures on these more costly items and to replace them with less expensive ones (without deterioration of the quality of the products that are produced). Scientists of the Kharkov Polytechnical Institute in conjunction with production workers of the Lyudinovo steam engine construction plant, for example, created the new TEM-12 maneuvering steam engine, which has four pairs of wheels instead of the traditional six. Using a gimbal drive, the developers also managed to save on several electric engines. In the Ryazan production machine tool building association the utilization of high-torque electric engines for machine tools with numerical program control significantly simplified the main drive and the entire design of the machine tool as a result of eliminating a large number of gear wheels, shafts, levers, prongs, switch handles, bearings and other batching items.



At the same time, one can give examples of an unsuccessful selection of batching items, as a result of which the mass and the cost of the products increase, and the consumer qualities can even deteriorate.

Designers of the Novocherkassk institute of steam engine construction, in order to account for electric energy expended by mainline locomotives, proposed to replace the simple, reliable and inexpensive induction meter, which had been used successfully for 20 years, and install on the new locomotives the F440 electronic meter which is series produced by the Vilnius plant for electrical measurement equipment. The old meter weighed little more than a kilogram, consumed less than 2 watts from the power network and cost 6 rubles, while the electronic meter was extremely unreliable in operation and complicated to install, and it has a mass of 5 kilograms, requires 25 watts, and costs 150 rubles.

In order to evaluate the potential reserves for reducing the mass and metal-intensiveness of machine building products, it is expedient to calculate its limit, that is, the minimum possible proportional mass which can be determined under modern conditions, arbitrarily assuming that the item is made up of components and parts from the best domestic and foreign analogous items, in which these components and parts have the least weight per unit of the basic technical parameter of the product. On this plane, there should be extensive dissemination of the recommendation of the UkSSR Gosplan concerning the need for the enterprises to develop a regularly updated card file of progressive analogs of the products they produce. This will make it possible to have more reliable information about the reserves for reducing the metal-intensiveness of the products and direct the production workers toward improvement of the structure of the design materials and new design and technological solutions.

The effectiveness of metal utilization is determined largely by the nature of the technological processes that are used and the condition of the industry that produces the blank pieces. The replacement of mechanical processing by cutting with more efficient technology which is based on the application of plastic deformation of the metal (hot and cold stamping and flattening, upsetting [vysadka], various kinds of rolling and so forth), reduction of the volumes of production of blanks by methods of free forging and casting in manually formed sand molds, more extensive utilization of precision and progressive methods of casting (chill, centrifugal, the lost-wax process [vyplavlyayemye modely], under pressure, the continuous casting method, in machine and sand shaped molds, and so forth), and the application of combined welding-casting, welding-forging and welding-stamping of billets, and modern methods of cutting metal products using computers and automatic cutting of metal provide for a sharp reduction of metal wastes and an increased coefficient of its utilization. There are immense possibilities in this area. Suffice it to say that in 1981 in machine building and metal processing the proportion of sets of equipment for processing metal by cutting was four times greater than the proportion of sets of equipment for reduced-waste processing with pressure.

As a result, the coefficient of the utilization of rolled ferrous metals in domestic machine building has remained for many years at the level of 0.72-0.73, as compared to 0.84 in industrially developed countries, and the



coefficients of the utilization of the most expensive ferrous and rare metals also remain at a low level. At enterprises of the automotive and machine building industry, heavy machine building and a number of other industries, the coefficient of the utilization of rolled brass does not exceed 0.6, and rolled bronze -- 0.7.

One can give as the main reason for such phenomena the distortions in the policy for capital investments, since recently only 5 percent of the industrial capital investments have been going for the development of the production of machines and equipment for branches of the national economy, even though the technical level of production depends almost completely and the growth of its effectiveness is two-thirds dependent on improvement of the quality, perfection of the structure and an increased quantity of machines and equipment. As a result, we are slow at updating the stock of technological equipment, in which a very large proportion is worn out and obsolete. And the rate of removal of the active part of fixed capital (machines and equipment) because disrepair and wear and tear still remains extremely low.

With respect to the main kinds of metal products (rolled ferrous metals, pipes made of all kinds of steels, cast ferrous and nonferrous metals, forged pieces made from ingots and so forth), for the current and planned periods it is desirable to determine the overall mass of parts for which the formation of molds begins with the corresponding technological process and to calculate the average coefficient of the utilization of metal from the initial process of the mold formation to the final product. A knowledge of the fairly detailed and complicated structure of metal processing for the various kinds of metal products that are used and the availability of a clear picture of the formation of wastes and losses of metal make it possible to manage the process of metal consumption more intelligently and to approach from authentically scientific positions the introduction of reduced-waste and waste-free technologies and the renewal of fixed production capital. This will also make it possible to make a major change in the utilization of metal in machine building and metal processing and to achieve the increase in the coefficient of metal utilization planned by the USSR Gosplan for 1985 to 0.78-0.79, and to reduce wastes by 25-30 percent, which will provide for a savings of more than 4 million tons of metal.

There is no doubt that there is a close and inseparable link between planning a reduction of the mass-intensiveness (metal-intensiveness) of products and measures directed toward improving their quality and increasing their reliability and durability. In essence, these two directions augment one another. As a result of developing the design, manufacturing a number of parts from high-alloy materials, and introducing new technology, better processes for thermal processing, and billets with minimum tolerances for processing, the proportional material-intensiveness of diesels of the Balakov Machine Building Plant imeni F. E. Dzerzhinskiy, which was previously 19 kilograms per horse power, was reduced to less than one-third of this, and almost 90 percent of the engines are produced with the Emblem of Quality. The length of time they operate before major repair was doubled, and the period of guaranteed operation for the consumers was more than doubled. At the same time the operation of diesels provided for a national economic savings of more than 375,000 tons of fuel and 15,000 tons of oil. Therefore in both the state

and plant standard for machine building products it should be compulsory to establish a limit (maximum level) on the expenditure of metal products (or design materials as a whole) per unit of basic consumer effect of the item, based on the level of this indicator for the best domestic or foreign analogs, the tendencies of scientific and technical progress in producing the item, the real possibilities of improving its design, calculations of permissible stress, refinements for the coefficients of the reserve of durability and application of more reliable testing methods.

### Organizational Problems

The following policy can be recommended for work in planning the metal-intensiveness of machine building products.

In the associations and enterprises the development of provisions for reducing the proportional mass and metal-intensiveness of the most important kinds of machines, equipment, instruments and metal structures for whose production most of the consumed metal products are expended, in our opinion, should be done during the comparison of the five-year and annual plans by the design, technological and normative services (with the enlistment of the division for material and technical supply) under the leadership of the head engineer who is responsible for implementing the technical policy and who has the necessary authority for establishing the policy and setting the time periods for conducting this work. The development of the proposals should apparently be done according to the list of products established by the ministry, taking into account the metal-intensiveness and the mass of the item, the volumes of its production, and the planned duration of its output.

In our opinion, in those cases when in terms of the most important technical and economic parameters, including the proportional mass, the new machine building products will lag behind the corresponding indicators of the best domestic and foreign analogs, the USSR State Committee for Prices should not set a price for this item and allow it to be series produced, but should return the plan for reworking. When products are certified, the State Emblem of Quality and the first quality category should apparently be conferred only on those items in which the proportional mass is equal to or less than that of the best domestic or foreign analogs, and the production technology includes reduced wastes.

Conducting this work in a planned way at all levels of production management and reflecting it in state accounting and report documents will help to implement the decisions of the 26th Party Congress for changing our economy over to the path of economical management.

#### FOOTNOTES

1. The authors' calculations are on the basis of data from the annual "Narodnoye khozyaystvo SSSR v 1980" [USSR National Economy in 1980]; "Finansy i statistika," 1981, pp 39, 40, 49, 126, 128, 185, 347.
2. Baybakov, N., "The 11th Five-Year Plan, Its Features and Tasks," PLANOVOYE KHOZYAYSTVO, 1982, No 1, pp 3-15.
3. Zav'yalov, P. S., "Koooperatsiya v mire kapitala" [Cooperation in the World of Capital], Moscow, "Mysl'", 1979, p 168.

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## RESPONSIBILITY FOR LOSSES OF TRAIN CARGO QUESTIONED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 115-121

[Article by V. P. Goncharenko, chief of the transportation administration of the UkSSR Ministry of Nonferrous Metallurgy (Dnepropetrovsk): "What Fell From the Train ..., or Who Is Responsible for Losses During Shipment by Rail?"]

[Text] I wish to draw attention to one of our significant reserves -- shipping national economic cargo without losses.

Even 10 years ago, up to 10 million tons of coal were lost enroute each year, including the most costly coking coal. Additional annual expenditures for clearing the road bed were estimated at that time at 50 million rubles. The USSR ministries of railways and the coal industry received serious complaints because they were not satisfactorily following the government instructions concerning preserving the coal during shipment. Instead of businesslike cooperation, these departments frequently engaged in squabbles about who should be responsible to the consumers for the fuel that was lost along the road. Even then the Ministry of Railways was told that it was not creating an industrial base at the proper rates for preparing railroad cars for loading, and that it was not keeping up with the repair of open cars and was dispersing them among numerous stations. Both ministries were told to take decisive measures to eliminate the losses.

We repeat: this was 10 years ago.

What has changed since that time? Now there are various estimates of the amount of coal that is lost, the most optimistic of which says that the losses are decreasing ... There are also assertions that 3 percent of the coal that is extracted annually is lost for good, or more than 20 million tons.

Taking into account the fact that during shipments there are similar losses of iron ore and non-ore raw material, coke, mineral fertilizers, cement and other bulk cargo, one can easily understand that the matter requires deep consideration and a new approach. The data at the disposal of the Novosibirsk Institute of Rail Transportation Engineers show that in monetary terms, the losses of these cargoes amount to about 500 million rubles a year.



Knowing the story of the lost cargo, one must admit that this is a thoughtless waste of the labor that is embodied in the thousands of extraction and transportation machines, mechanisms, and immense covered complexes which operate facing the wind, in the direct sense of the word. Then there are the lost possibilities of producing new products which are valued at several billion rubles, and the idle time of equipment and people waiting to receive the raw material. This is a direct waste of heat, electric energy, metal, and chemical and other kinds of products. This also means smaller crops because of the shortage of mineral fertilizers, and a smaller quantity of animal husbandry products -- because of the shortage of feeds. The spectrum of the losses is multicolored, as are the measures suggested to eliminate them. And still the main one, apparently, is simply to establish the responsibility of the shipping and transportation workers.

Let us take a look at two sets of regulations for the railroad -- the one that was in effect from 1935 through 1964, and the one that is in effect now.

In Article 67 of the 1935 document it is written: "The railroad bears full responsibility for protecting the cargo it has accepted for shipment, from the moment it is received for shipment until it is delivered to the recipient or by the number of pieces, depending on what kind of cargo it is. The railroad receives the cargo in terms of weight or the number of pieces." Is it possible to say more succinctly or clearly -- "bears full responsibility for protection ...", "accepts the cargo from the client by weight." But read carefully Article 53 of another set of regulations which has been in effect since 1964. There it says: "Upon release by the cargo dispatcher and receipt by the railroad of cargo that is shipped in bulk or loose form, liquid cargo or cargo in containers, their weight must be determined and indicated on the bill of lading." Article 54 clarifies: "The weight of the cargo is determined: a) by the railroad -- during loading in places for general use; b) by the cargo dispatcher -- during loading in places not for general use. The weight of the cargo is determined ... in all cases by the cargo dispatcher."

Herein, in our opinion, lies one of the roots of the problem! Since the weight of the cargo is determined in all cases by the cargo dispatcher, this means that everyone is responsible only to him. In practically all cases the cargo dispatcher and the cargo recipient are doomed to straighten things out between themselves, regardless of the amount of the losses enroute.

For complete safety, the transportation branch has provided itself with reliable insurance with the deliberate and pointed entry in Article 46 of its regulations: "The railroad is obligated to submit for loading cars and containers that are in good repair and suitable for shipping the given cargo. The suitability of the rolling stock for shipping the given cargo commercially is determined: the cars are determined by the cargo dispatcher, if his equipment is used for the loading ..."

Thus with the regulations approved in 1964 the shipper has been relieved once and for all of the responsibility for protecting the cargo he ships!

The situation which has arisen with respect to the protection of loose and bulk cargoes and the interrelations among the cargo dispatchers, the cargo recipients and the transportation workers give rise to certain questions. First, is there any need or any point in having shippers maintain the cars in good repair?.. Second, are the transportation workers doing everything possible to keep the cars in good condition and use them for their intended purposes?

In practice the answers can only be negative because the railroad workers do not bear personal responsibility for the protection of the cargo. Such responsibility will not appear of its own accord, for it must beat its way through a sturdy protective shield -- the railroad regulations, according to which, as we have already explained, only the dispatchers can be guilty, and the shipper is always right and innocent.

But the reality is that, in direct violation of the regulations, and also the "Rules for Shipping Cargo" and the "Rules for Technical Operation of USSR Railroads," in the operational fleet there are tens of thousands of cars that are "sick" or "suitable with limitations." For years they have been filling up the railroads, making the activity of enterprises of the national economy more difficult. And these same cars are the main sources of losses of cargo enroute, for which, however, according to the mechanism with which we are already familiar, only the sender pays.

The category of cars with limited suitability even includes cars which have retained only their wheels, brakes and some things which remotely remind one of what once was a car. They will be recognized as completely unsuitable only when there is not a single cargo dispatcher who will send even a part of his products in such a car at any price, thus sparing the enterprise from failing to fulfill the plan and having difficulty in obtaining bank credit.

But if a cargo dispatcher has agreed to send cargo in a car that is in disrepair, he has by so doing defined it as "commercially suitable." Consequently, he himself is responsible if the cargo delivery is not complete or is damaged. And if the dispatcher has not found the car suitable for loading, again this is his own concern and his own fault. He will be unable to fulfill the plan, and will have to deal with the consequences.

In our opinion, an objective evaluation of the matter and a good solution to the problem were offered by V. Advakhov, the brigade leader of the technical service point of the Lesosibirsk station, who is a specialist in railroad car management with 35 years of experience. In his article, "Why Is the Car in Disrepair?", published in the newspaper GUDOK on 28 January 1982, Advakhov writes: "I also think that we should revise the policy for sending cars to the depot and car repair plant. It is necessary to repair first of all that rolling stock which actually needs repair. But in practice it turns out that they select the cars that need less work. They change the wheels or the automatic coupler, and that is all. And the cars that have been through "hard times" do not end up in the depot. Nobody wants to work on restoring them."

This is exactly the right time to clarify one other issue: how do we motivate the railroad workers to work on the restoration of cars and maintain the fleet in the proper technical and commercial condition?

It is necessary to arrange things in such a way that it is economically disadvantageous for the railroad worker (including out of considerations of personal well-being) to ship cargo in cars that leak, scattering public property in the wind. Railroad transportation workers begin this conversation with a counter-argument: who will give back to them the tens of thousands of weighers who were discharged previously?

It is difficult to respond to this objection. But if we look at the real cost of what is going on it becomes clear that the problem must be resolved once and for all. We do not have the right to throw away 500 million rubles' worth of bulk raw material during a year, to spend 50 million rubles on cleaning up the areas around the railroads, or to deprive ourselves of the possibility of producing several billion rubles' worth of additional products.

One can see a way out of the situation that has arisen in the following. It seems that the time has come to change the policy currently in effect in the country for employing weighers in various branches (metallurgical, coal, machine building and others). This service can be transformed into an independent, unified state service. Or it could be under the jurisdiction of, say, the Gosstandart, which works directly with weighing and has the appropriate territorial agencies.

The former departmental weigher will become a state weight inspector (or he can be called something else). There should be no doubt (including in the Ministry of Railways and the arbitration commission) about the precision and correctness of documents which are certified with his signature.

Subsequently, events will develop simply. If at some point in the country a car is loaded and the state weight inspector has filled in the weight on the bill of lading, the shipper will be responsible for the deviation from this weight in excess of the norm for natural losses if it is discovered by another state weight inspector when the cargo is turned over to the recipient.

Specialists who have been on the job for some time will recall the economic experiment which was conducted in the Kuzbass 15-20 years ago. At that time the railroad was responsible for preserving the coal that was shipped. During just one year the losses of fuel decreased to one-half - two-fifths! This was achieved mainly because of the fact that the railroad workers began to send for loading only cars which were in good repair and suitable for shipping coal. It seems that the results of this experiment should be taken out of the archives of the USSR Ministry of the Coal Industry and Ministry of Railways, and the conclusions necessary for the national economy should be drawn from them. At least they will be correct, even if they are late in coming.

Let us return, however, to our suggestion. In our opinion, it will not be especially difficult to establish a policy of interrelations among branches of the national economy, transportation, and the weight inspection service and to develop a system of payment and material incentives. The main thing is that conditions should be created whereby each worker of this service will be able to give precise measurements.

It is very important to give the transportation workers economic incentives to eliminate the immense and ever increasing material losses that are being discovered in all branches of the national economy and, through the efforts of the railroad workers, to provide for maintaining the entire fleet of cars in good repair (as was the case before the introduction of the regulations of 1964). This would result in having 100,000 to 200,000 additional cars that are in perfectly good repair!

With centralization of the weight inspection service, conditions would arise for more efficient utilization of the entire weight service as well as each worker in it, and the overall number of the latter would even decrease. Arbitration and complaint work would be reduced considerably. And in addition accounting discipline would improve and the possibilities of write-ups would decrease sharply.

From the Editors. The author sees the solution to many problems in restoring the system of weighers. But the facts presented in the article lead us to broader and more important conclusions. To make the railroad and its clients partners with equal rights in economic relations and to interest workers of the Ministry of Railways in the final national economic results -- these are immensely significant issues. Perhaps the readers will suggest their own effective solutions.

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## WORK OF INVENTOR GUR'YANOV DESCRIBED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 123-132

[Article by Mikhail Berkovich, journalist (Novokuznetsk): "Gur'yanov from the Experimental Shop"]

[Text]                      What happiness it is, my friends: to do everything,  
that can be done!

Cosmonaut V. Kovalenok

Twenty years ago, the director of the Kuznetsk Metallurgical Combine at the time, Doctor of Technical Sciences B. N. Zherebin -- the same one who started up the first blast furnace at this enterprise and produced iron from it on 3 April 1932 -- surprised the combine's mechanic. Zherebin had created an experimental shop for mechanization, and he appointed as its chief ... the electrician of the blast furnace shop. It is understandable that his candidacy was discussed in the blast furnace shop and by the trade union committee, and everywhere else, the more so since this electrician, Gur'yanov, had refused the new position. But Zherebin was able to "make him volunteer" to do the sensible thing.

### What Did the Inventor Not Know?

Then, after long discussions with the director, Vasilii Grigor'yevich Gur'yanov understood with inescapable clarity that he would have to change his place of work in any case. To be sure, the busybodies were disturbed. "They could not select an engineer-mechanic! What does he know about mechanization, your Gur'yanov? And if they looked hard enough they might be able to find someone who is younger. After all -- 48! He will not even be noticed before he goes on a pension ...."

Usually the people who say the most are those who know the least. But Zherebin had known Gur'yanov when he had been the head engineer of the combine and was "under his jurisdiction" in the famous creative brigade. It included 120 people -- the best minds in the combine, among whom were the director R. V. Belan, the chief of the blast furnace shop I. F. Domnitskiy, and many other specialists. The brigade was led by Vasilii Grigor'yevich Gur'yanov -- a blast furnace electrician.

During the 1960's the brigade cooperated with many scientific research institutes, including the Siberian Branch of the USSR Academy of Sciences, and was known to metallurgists throughout the country since it had solved the key problems of the technology of blast furnace production, its mechanization and automation, and had created industrial robots at a time when people were only dreaming about them. The list of technical innovations to the brigade's credit was long. The number of ideas was incredibly large. And the organizer, the "generator" of the brigade, was Vasilii Grigor'yevich Gur'yanov.

But why him instead of anybody else? There is a joke: "Inventors are ignoramuses. All the people around them know that it cannot be done, but for some reason they do not know this ..." They begin to wrack their brains over a problem, and frequently they solve it, to everyone's surprise. And Gur'yanov was one of these "ignoramuses".

At the beginning of the 1930's the Kuznetsk metallurgical combine had just gone into operation. All around were imported equipment and foreign specialists. All of the technical terminology was either English or German. Our furnace workers, steel smelters and rolling mill operators had not yet managed to figure out the complicated equipment and gain experience, and they looked at each imported mechanism as though it were a miracle. It was at that time that a new winch from the famous firm Otis arrived in the shop. They were afraid to breathe on it: they would turn it on, turn it off and oil it... The winch became famous because the young Gur'yanov threw away the German control circuit and replaced it with his own, and the capacity of the winch increased by 20 percent.

#### Eternally Indebted

We climbed up the steep steel stairway from the skip pit to the machine division of blast furnace No. 5. It is relatively clean here and there is no roar of machinery. One can hear only the clicking of the contacts of the automated machines. This machine room was created by Gur'yanov. He showed it to many people. Both American and German specialists have been here. They have looked at Gur'yanov's machines and asked questions. They had never seen this level of mechanization of blast furnace production before.

And when the deputy chairman of the USSR Council of Ministers, I. F. Tevosyan, would come to the plant he would always find Gur'yanov and ask him what was new. Because whatever was new pertained to the whole branch, because for a half century the blast furnace workers of this combine determined the technological innovations. They achieved the greatest productivity for the sets of equipment, they were the first in the world to make the blast furnace process continuous, and they were the first to use sinter.

The director of two institutes, Academician I. P. Bardin, would also come here. He would ask Gur'yanov to his hotel room: "What are you introducing? What are you working on?" And there was always something to tell him.

We climbed up to the level where the rotators are loaded with coke. Porous clumps poured through a steel screen, as though into an inferno. But still some of them remained and two workers were raking through them with shovels. Gur'yanov took a look and said:

"Wherever I go I always feel indebted. Why should people be doing what a mechanism can do? Here it would be possible to install brooms like those that are on the machines that sweep the streets ..."

"Why not do it?" I asked.

"I do not have the time. I am always behind ... "

The foreman of the Marten furnace shop sent a complaint against Gur'yanov to the head engineer of the combine: he is not creating machines for closing the damper doors. This was correct -- and the machine tools are needed: this is the latest word in steel smelting. But are machine tools really all that is needed? And will the mechanization of the repair of the Marten furnaces wait? Or can they put off tempering the ends of the rails for the BAM? Just take a look into Gur'yanov's shop and name the work that can be put off.

"In order to satisfy everyone," Gur'yanov puts it briefly, "it would be necessary to have four shops like ours."

How to Raise People?

Regardless of all the nice things that are said about Gur'yanov and his shop, there are two words which he cannot forget. These are "comprehensive mechanization." The combine has been knocking at the door for a long time, but the experimental shop for mechanization provides only individual new machines and adapters.

For example, the national economy needs machines that are light and at the same time reliable and capable of operating under the conditions of the Far North. Everyone understands that these can be made only of special steel. And this means that it is necessary to produce such steel!

And metallurgists are testing technological innovations, introducing bucket metallurgy, blasting hot metal with inert gas, and they are learning a new way to carry out smelting operations. There are many plants, and equipment is not series produced for these operations (or even simpler ones). And therefore the Western Siberian Metallurgical Combine produces its own damper gates, and 3 kilometers away the Kuznetsk plant does the same thing. Then they visit one another and exchange experience and decide which mechanisms are better. And yet everything could be different if the USSR Ministry of Ferrous Metallurgy, the staff of the branch, would take responsibility for series production of standard equipment so that it would not be necessary for the experimental shop for mechanization to make beforehand the stressed stands for the 450 machine. For there are many of these machines in the country, and each one needs such a stand. Workers of the shop should not have to be bothered with an installation for blasting steel with argon, because every plant that produces steel needs such installations.

Gur'yanov is the chairman of the combine's commission for new technology. He is telling everyone who will listen that even noncomprehensive mechanization should be handled by each large shop with the help of a special section. Gur'yanov insists that the managers of production lines and large shops (including party, trade-union and Komsomol leaders) are obliged to deal with this important matter every day. It is necessary to account for every working position which involves manual labor and to work on reducing the number of these positions. Gur'yanov does not want to be the "fireman" of technical progress at the combine, to "put out fires that are burning first in one place and then in another." But it is probably necessary to "put them out" until the problem of renovating the combine is solved.

But it is not easy to get ahold of even individual, uncoordinated machines to be installed in the most difficult places. Suffice it to recall how Gur'yanov created his own remarkable car scales. To this day there is only one of these unique sets of equipment. The car scales themselves gather the charge for blast furnace smelting, depending on the kinds of iron, and they weigh the materials themselves and send them to the top of the furnace. All man has to be concerned about is setting the program, and the equipment does everything else without his help. I saw the car scales traveling serenely from hopper to hopper, gathering portions of ore, sinter, lime and coke ....

Several research collectives have worked on creating automatic car-scales, but have been unsuccessful. But this automated equipment is working! Specialists still come here from various parts of the country and from abroad in order to examine it.

I still checked with Vasilii Grigor'yevich:

"So there are no other scales like this anywhere? ..."

"They tried to make some at the Karaganda combine, but something went wrong. Several years ago, they attempted to make automated scales like these at the Bhilsa metallurgical combine in India, but I do not know what came of it ..."

Sometimes people scold Gur'yanov for the fact that he accepts very difficult orders, and sometimes the shop does not have the equipment and conditions necessary for carrying them out. But still he tries to take on the most difficult work:

"People need to grow. And they will not grow doing simple jobs!" -- he shook his finger.

The People Are Growing. But the Shop?

The shop had neither space nor equipment when Gur'yanov was appointed to be its chief. Everything was achieved with a struggle. Vasilii Grigor'yevich talked the director out of the large boring machine which stands in the very center. As soon as it had been delivered the head mechanic ran up:

"Do not set your mind on installing it, it is not for you!"



"What do you mean, it is not for me?" Gur'yanov replied, "I have already signed for it! I need it very badly!"

"The mechanics shop needs it more," the mechanic insisted.

They had to go to the director again. Gur'yanov ended up keeping the machine anyway. But this incident again emphasizes the attitude of certain specialists toward the experimental shop: it is not basic and one can do without it. It can wait until we get more money. This is why none of the equipment in the experimental shop matches, and it is gathered from wherever it can be found.

The long lathe has been given the nickname "Mister Brown." It is obviously of foreign origin. It was found in the storehouse for scrap metal. Somebody probably forgot where to deliver it and sent the machine tool to be melted down. The metal worker V.N. Pushkarev ("I bow low before him," says Gur'yanov, "he has done a lot for the shop.") and the mechanic V. S. Chuntanov restored the life of the machine. And now "Mister Brown" is a reliable helper to the lathe operators: all the extra-long parts are processed on it.

The machine operators have taken about ten other machine tools from the scrap metal warehouse and restored them in the same way. And they have made a couple dozen of them with their own hands: various kinds of rolling machines and presses. Nobody would have given the shop these mechanisms.

Orders for the shop are filled out in the following way: if no other plant will take on a particular machine, it is made by the Gur'yanov "professors." And since there are quite a few orders like these, the people really do not have time to take a break. To put it more concretely, during the time of its existence the shop has given the Kuznetsk metallurgical combine hundreds of machines and mechanisms which today have made it possible, without increasing the number of personnel, to improve the quality of the products and to reduce their production cost. And this is in all production lines and in all metallurgical divisions.

Today the Sibruda production association (this was formerly the combine's mining administration) has the best indicators in the country, largely because of the experimental shop for mechanization. Because it has made the most highly productive technical equipment.

The 170 workers of the experimental shop for mechanization annually produce 900 tons of nonstandard equipment (during the years of its existence it has released about 20,000 tons). It is a shame to count its products in tons, but what can be done -- such is the nature of the accounting system! The shop is considered to be one of the largest in the branch but it has not satisfied the needs of the enterprise for a long time. And therefore people in the shops and production lines of the combines live from day to day. For example, there is the small tool-grinding machine. The metal worker will place a circular saw in it and then leave. He will not return until it is time to remove the instrument that has been ground. A good, intelligent machine tool. And nearby they will be bending the corners of a bed spring by hand. Is this such

a complicated operation that it cannot be mechanized? Of course not. But the experimental shop has not had time for it ....

And this is why the shop workers think that its capacity should be doubled. But the authors of the plan for renovation of the combine say something different: "Why have such a large experimental shop for mechanization if we are going to replace all of the technology and equipment with the latest that is available?"

"So we replace the equipment. Is this the end of the world or something?" Gur'yanov is disturbed. "After all, there is no limit to the improvement of technical equipment, but there is a limit to aging. Moreover, during the time of renovation there will be a large load on our collective. It will still be necessary to manufacture unique machines which nobody except for us will make. This is why I insist on expanding the shop."

At the Foot of the Himalayas

What is an experimental shop? It is the same as a mechanics shop. The range of jobs and the machine tools are all the same. Except that people cannot be kept in mechanics shops, and here there is no personnel problem. Why? The pay is not the answer, and there is also a waiting list for housing .... The usual human problems exist here, except for the desire to be discharged, to go to another shop or to leave the plant.

I witnessed, for example, the following scene. First a head poked into the office, and after it came a young lathe operator. He had just completed the state vocational and technical school. He took out of the front of his shirt a not very finely processed roller and said to the shop chief:

"Vasily Grigor'yevich, may I take this home to show to mama? ..."

Gur'yanov practically jumped out from behind his desk:

"Of course you may! I will take the roller past the guard myself, and let your mother see what kind of work you are doing. I just hope she likes this roller! And you, my boy, will be a good lathe operator!

"It is very important," he told me later, "for a person to understand the importance of his work. It is necessary to explain to people what they are doing and why. If I see that a lathe operator, once he has made a part, runs to see where the assembler will put it, what function it will perform, this means that he is not indifferent to his work. The worker's attitude is the main thing. People do not like declarative instructions, and I try not to annoy them with them. I love it when people know more than I do. I try to make sure that each person is selfless and intently involved every day. Nobody should have any spare time, because we are doing something that nobody has ever done before. I tell my boys: 'The spray flies into the face of the steel worker. Nobody knows how to watch out for it. Shall we make him a protective device?' Who will refuse if the question is posed this way? And this is interesting, and necessary, and nobody has done it yet ...."

For many years the shop has held the title of a collective with an advanced culture of production. This culture, it seems to me, begins with Gur'yanov, with his attitude toward people and his relations with them.

"Some managers think that Gur'yanov's main virtue is that he is an inventor," reflects the deputy head engineer, Boris Petrovich Yel'tsov. "But we have other inventors, and people are not especially drawn to them. Gur'yanov's main characteristics are: a keen sense of the new, beneficence and selflessness. Dissension begins in a collective when the senior person tries to take more for himself. For Gur'yanov this is unthinkable."

"I do not recall a time when he has punished anyone," says the shop mechanic, the chairman of the trade union committee Susuyev. "He just sees to everything himself. This Kuznetskstroy stuff has become an impediment: in the shop there are intelligent engineers, and he has even become accustomed to taking on their work. But sometimes his zeal goes too far. One time several machine tools broke down at the same time. He shouted at a mechanic ...."

I told Gur'yanov about this and he became a little flustered:

"They are right about that; it is a fault of mine. Sometimes I just cannot restrain myself. And I should."

It is Saturday. It is quiet in Gur'yanov's small office. Dozens of lathes are in operation downstairs, and the foreman of the high-grade rolled metal shop, A. M. Korchemnyy and several metal workers have come to adjust the stress stand of the 450 mill. This stand promises an immense advantage -- it will make it possible to roll metal with minus tolerances, which will make it possible to save about 2,000 tons (and perhaps even more) of steel each year. But even the steel that is saved is not the main thing. They now receive frequent complaints about the strip of metal for the plows: the combine makes them thicker than they are supposed to be. Agricultural machine builders have to cut off the excess themselves.

Gur'yanov is also an unpredictable person. On that same Saturday quite unexpectedly I heard him say thoughtfully:

"Mahatma Ghandi was right with his theory that civilization consists not in the growth of material demands, but in the deliberate limitation of them. It is necessary to raise the level of spiritual life. This is more important than improvement of material well-being ....

During a half century of work at the combine (and what work!) Vasilii Grigor'yevich has not bought a dacha, or a car or fancy furniture -- this is not what he has lived for. He sincerely believes that he does not have the right to be concerned about all these superficial things. He thinks this: "If you have entered the communist party you should not be concerned about yourself but about people. If you have a dacha, let it be a collective one. Have a garden, but a public one. Let black tulips grow in the beds, but not for sale ...."

He has dreamed about travel since childhood. He went to the school in the village of Borovlyanka. And when he finished this school he entered the geological tekhnikum. But to everyone's surprise he left the tekhnikum and fled with some friends to Kuznetskstroy.

"Do you remember why the people did not finish building the Tower of Babel? God confused their tongues and they could no longer understand one another," he says. "It was the same at Kuznetskstroy; it seemed that everyone who worked here spoke a different dialect! Soviet power gave them a common language, and so we managed to construct the combine in two and a half years. An unheard-of period of time!"

He looked at me as if to see if I could understand what it meant for such a giant to be constructed in two and a half years! It is an incredibly short amount of time even for today, and at that time the construction was done by illiterate peasants with shovels. And is it not because he was educated and reared on the traditions of Kuznetskstroy that Gur'yanov became Gur'yanov?

At the beginning of the 1960's he wanted to become familiar with the way of life of the Kuznets Tatars. Along with his old friend I. P. Chirkov, who was assistant director of the combine at that time, during vacation he set out on foot to Gornaya Shoriya. They walked hundreds of kilometers, composed limericks, became familiar with the customs of this small and courageous nationality, and had occasion to become familiar with their folk medicine and with voices from the past -- the shamans ...

Upon returning home they went to the oblast party committee and raised the question of the need to solve many problems of the difficult taiga life of the Shorian people.

We were walking through the shop. Gur'yanov inspected the design of future machines and said what bothered him most of all:

"Today everyone needs the experimental shop. And it is gratifying that the shop is needed by the combine, and I am needed by the collective. What else does a person need? ..."

And again quite unexpectedly he admitted:

"I would like very much to visit the Himalayas. You know I have been in the Caucasus, the Pamir, but I have not made it to the Himalayas ...."

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## FUNCTION OF FEEDBACK IN COMMUNICATIONS DESCRIBED

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[Article by Otto Novozhilov, sector chief at Institute of Problems of Management of the National Economy of the Belorussian SSR Gosplan (Minsk): "How to Shout Hello ..."]

[Text] The words and deeds of people, the responsive reaction of coworkers and neighbors, relatives and friends, immediate supervisors and administrative agencies, form a gigantic round dance of signals addressed to our life and our work. This infinite circular movement of information from man to the environment and from the environment to man is just as inevitable as the exchange of substances. But people (with the exception of specialists) are interested in this exchange only when it is disturbed in its normal course. Alas, not only in the exchange of substances, but also in the circulation of information there are abnormal processes and breakdowns. They not only cause no small amount of economic harm, but also lead to moral losses.

### In Search of Feedback

The most undesirable violation of the system of feedback is the lack of it, when good deeds are not encouraged and bad deeds are not condemned. One can shout hello as much as he wants to -- there is not so much as a "by your leave"! Of course we are speaking not so much about the indifference of one person toward another, as about the indifference of an official toward his duties. If the signals that come in from the residents, buyers, clients and also from the enterprises and working positions go no further than the official and go through the seat of the public chair into the ground, this means that there is something wrong with some part of our social organism.

Memory suggests examples from the most diverse areas. For instance, a secondary school graduate cannot receive a medal she has earned honorably or a working man must take a third absence in order finally to meet with the television repairmen; or a labor veteran goes on a pension, and nobody will even give him a good word ...

Nervous people with rolls of blueprints walk through the corridors of the ministries and departments in search of feedback. They are inventors.

Invention is perhaps a sphere of human activity in which responsive reactions are especially important. More than 100 inventions are registered in our country every day. Approximately 30 of them will subsequently be applied in the national economy. This is a fairly large number, but what if competition could be used to make sure that these 30 were the most valuable inventions! But the opposite is what happens: they select the ones which can be introduced most easily and not those which will produce the greatest effect.

Now let us take a look at these figures -- 20 and 100 -- from another side. In our day it is not at all simple to think of something new and useful. And people certainly do not invent things for the sake of a piece of paper called an author's certificate, although, of course, receiving such a piece of paper is nice in and of itself. But if in 70 cases out of 100 the reaction to an invention is only an author's certificate, it is quite clear that this kind of feedback will not give the inventors much inspiration. Many of them will be forced to become advertising agents for their own developments.

#### Who Should Be Encouraged and Who Should Be Penalized?

I look out the window and a Volga of some unusual ash color has parked across the street. The front doors have opened and a couple has emerged: he and she. Their clothes ... my goodness, it is a scene from a foreign film against the background of our undistinguished yard! But the most surprising thing is their age. They are 20 at most. Who is that boy? An eminent artist, an artistic genius, a writer? No, he is the son of a man who has been justly rewarded by society for his highly useful labor but who is pedagogically illiterate and thus has unjustifiably relieved his offspring of all earthly concerns.

Now another variety of this same disease of feedback. A person receives punishment for something of which he is not guilty. We can recall from childhood how offensive that is. In kindergarten, just because one child has misbehaved, a poor educator makes the whole class sit quiet and still with their hands folded. A similar pedagogical device is also frequently used in school. A feeling of collectivism is supposed to be instilled this way. That is wrong! If we figure it out, we are faced with nothing other than the "hostage method." To punish anyone for someone else's crime is immoral. And the use of this kind of punishment is not restricted to kindergartens and schools. In production, adult aunts and uncles apply these methods to other adult aunts and uncles. The rank-and-file engineer of the Minsk automotive plant is deprived of his bonus because of the poor indicators ... of an enterprise which is located in Mogilev. But why is this so: the association!

And it also happens that the successes of the lower worker are not encouraged by the higher worker, initiative exhibited by a leading worker is not noticed, and the adherence to principles and meticulousness of the people's controllers cause a lot of trouble. And then the official comes to the conclusion that a position of "I see nothing, I hear nothing" is inadequate, that dirty laundry is being washed in public, and that it is time to act ... And too many workers with initiative are being forced to leave at their own request (one can find many topics like this in any newspaper).

One is not bothered so much by the hindrances in economic management in and of themselves as by the fact that they are followed by a second wave of feedback. In the collective one begins to hear the phrases: "What do I need most of all?" "Initiative is penalized," "Find reserves and wreck your nerves" ...

#### Wages -- the Lever of Feedback

At this point in the article one can hear the voice of the reader: "What do you suggest?"

There are many suggestions -- both general and particular. Generally speaking, it would be necessary to study all spheres of our activity from the standpoint of the feedback mechanism.

If one is to touch upon a sphere with which the author is more familiar than he is with others, it seems that the main thing here is to make sure that labor is always fairly evaluated and paid for everywhere.

By regarding wages as one of the forms of feedback and comparing it with certain feedback mechanisms in biological and technical systems, one can discover special requirements for the system of wages. They will not be adequate to real labor under real conditions until they have the necessary diversity, dynamism, rapidity and reliability.

It is necessary to overcome oversimplification in the construction of the wage system, which leads to equalizing and to all other diseases of feedback which were discussed above.

Let us take, for example, the evaluation of the qualifications for labor. As we know, qualifications are increased continuously, while the evaluation of them in categories increases in intervals. A small number of categories and, consequently, large intervals between them lead to a situation in which, within a single category, the same wages are paid to people with significantly different levels of knowledge and ability. It is also known that within one and the same occupation, one category or one wage rate, the working conditions can differ essentially at different enterprises, and at the same enterprise they can differ in different shops, sections and work positions.

At the Volga Automotive Plant, within the framework of each category they have introduced an additional payment for occupational mastery. Actually, this is tantamount to increasing the number of categories from 6 to 12. Additional payments have been introduced for deviation of working conditions from the norm in the amounts of 4, 8, 12, 16, 20 and 24 percent of the wage rate. Thus the number of variants of the hourly payment within one wage scale has increased from 6 to 72 -- 12-fold! The VAZ experiment, which has been repeated by other enterprises (in Belorussia -- the Borisov Avtogradil'skiy plant, the Minsk Gorizont production association, and others) has clearly demonstrated the possibility and effectiveness of making the wage systems more complex in order to account more fully for every diverse condition encountered in real work.

And a number of questions arise in connection with this. Has the "experimental" stage not been drawn out too long? After a successful experiment will everything not die down again, as has repeatedly been the case? Why can a system that is known to be more logical and effective not be introduced everywhere? Is it not an elementary desire not to complicate one's life that lies behind all the conversations about the complexities and difficulties and the need for careful preparation? Preparation is necessary -- everyone agrees -- so do it!

The principle itself is important: more precise and complete accounting for the peculiarities and conditions for work in each working position. And we should probably be speaking not only about the workers and not only about industry. Everywhere we look we see examples of how physicians, teachers and workers of many other professions whose work is good, average or poor who all receive the same wages within the limits of one indicator which can easily be measured -- length of service. And only administrative and social measures affect the quality of their work -- wages do not participate in management. Moreover, a physician or teacher who is working well ends up in a worse position, because "the one who pulls is the one who gets the load." Frequently the existence of simplified systems of payment are justified by the need for simplicity, which everyone understands. But here they do not take into account the fact that the border between "simple" and "complicated" changes sharply as the intellectual and educational level of the masses rises.

With Whom Do the Chains of Uncoordination Begin?

When speaking about fair pay it must be noted that the work of a production collective and its results depend both on the collective itself and on many external circumstances.

The newspaper SOTSIALISTICHESKAYA INDUSTRIYA has twice criticized the Belorussian automotive plant for the poor reliability of its 75-ton BelAZ-549 dump truck, whose actual productivity is approximately at the level of the 27-ton BelAZ-540, and it costs six times as much! I have before me a note signed by the head designer of the BelavtoMAZ association, M. S. Vysotskiy: "The tires manufactured by the Bobruyskshina association last for 15,000 kilometers instead of the required 30,000; the traction motor delivered by the Moscow Dinamo association can go for an average of 90,000 kilometers before the first capital repair instead of the required 150,000; the engine manufactured at the turbomotor plant in Sverdlovsk operates for 5 thousand motor-hours before capital repair instead of 20" ...

Or another reference. The irregularity of the deliveries of rolled metal to the Gomel Gomsel'mash association (a quite ordinary phenomenon) leads to irregularity of production and makes it necessary to replace one brand of metal with another, which worsens the quality of the parts and disorganizes the assembly (the suppliers are the Krivoy Rog and Chelyabinsk metallurgical plants and the Volgograd Krasnyy oktyabr' plant). The Kharkov tractor engine plant also leaves its mark on the work of Gomsel'mash: 8 out of every 100 engines that are sent are defective. The contribution of the Lipetsk Tsentrolit: 16 out of every 100 reduction gear housings are defective. The Taganrog combine plant delivers gear housings, and out of every 100 there are



39 (!) which are rejected during the inspection upon arrival. Now, incidentally, they have already reconciled themselves to the existence of this kind of control, and sometimes it is passed off as an organizational discovery mission. And yet this is absurd if one thinks about it, an absurdity which is engendered by the irresponsibility of the technical control departments of the supplier plants. In 1981, 47 percent of the oil radiators delivered to the Minsk tractor plant (supplier -- the Buguruslan Radiator Plant) were declared to be unsuitable!

If one does not count hurricanes, road wash-outs and floods, then all the "external" difficulties experienced by the enterprise are the result of somebody's poor work. Regardless of how long these "chains of uncoordination" may be, one way or another, here or there, on one level or another, the factor that impedes the increase in production efficiency always has a last name, a first name and a patronymic.

And how do the administrative agencies frequently react to the alarm signals of the enterprises? I recall that in VECHERNYY MINSK there was an article about the operation of the Minsk champagne plant. Among other things it was announced that the plant had failed to receive 1.5 million corks. "But one must not bow before such difficulties," the author of the article wrote boldly, "at each enterprise there are large internal reserves which must be skillfully utilized." This is how the people in management agencies sometimes react. Just think -- 1.5 million corks! You must find something with which to stop up the bottles! ... This kind of juggling and replacing assistance with shouting or bad advice leads to a situation where neither the victims nor their "advisers" fall into the area of public attention and assistance. When they say: "It does no good to refer to external difficulties; improve your own work!" -- this is illogical: in the first place it is necessary both to eliminate external difficulties and to improve one's own work -- the one does not preclude the other. In the second place, if the enterprise has shortcomings in labor organization this certainly does not mean that, as a kind of punishment, it should be given unsuitable raw material, or even be kept at subsistence level. In the third place, practice shows that internal disorganization usually begins with a disturbance of the rhythm of deliveries, or else with mistakes made during planning for the enterprise.

If one closes one's eyes to external factors, as a rule, the actual responsibility for their effect is shifted to someone who is not to blame while the real guilty parties go unpunished.

One can understand the general director of the Gomsel'mash association, N. I. Afanas'yev, who stated: "We consider the most radical means of improving the quality of self-propelled combines to be to refuse to cooperate and to produce all parts and components locally ... " This is a cry of despair! Many managers have a desire to make their enterprises "self-propelled." "This kind of psychology," it was stated at the 25th CPSU Congress, "was engendered by the fact that planning and contractual discipline are violated in many areas. But it is necessary to fight against this by increasing discipline and not encouraging tendencies toward subsistence management and departmental restrictiveness."

In order to arrange a feedback mechanism, it is necessary to have information about violations of contractual discipline. It would seem that there could be no better source for this information than the victim. But sometimes the enterprise receives from this signal not an advantage, but only bad relations with capricious suppliers.

Collectives of enterprises that are operating well strive through their self-sacrificing labor to compensate for shortcomings that come from the outside. But this is far from always possible, and the main thing is that this does not eliminate the cause, and the feedback is ineffective. And it turns out that, on the one hand, these enterprises through their extreme efforts perform an important national economic task, and, on the other, they cover up violations of state discipline and thus objectively cause harm to the national economy. The solution to this problem, of course, lies not in forbidding enterprises to take special measures and utilize internal reserves in order to compensate for poor work of their associates (incidentally, under other conditions these reserves would go for increasing production effectiveness). When evaluating work of a collective one must simply proceed from an idea that the same result should be rated more highly if achieved under more difficult circumstances. This would seem to be obvious: after all, for one and the same indicator of productivity in one year awards should be given, while in another year there should be a reprimand. In industry, in agriculture and in construction it is necessary to strive to fulfill the plan even under difficult conditions. And if it is fulfilled, then when evaluating the work and determining the bonus, it is logical and fair to pay attention to the category of conditions: for instance, normal, difficult and especially difficult.

Of course, if such a provision were introduced, the flow of information about violations of the normal working conditions would increase many times over. And there would be added concerns about clearing up confusion. But is it really possible to increase planning and contractual discipline without this information? Without it, is it conceivable to provide feedback in all cases of violation of labor discipline without exception, and not only when someone's irresponsibility reaches extreme proportions?

Of course, the evaluation of the conditions in which the enterprise is operating is only a part of the system which guarantees the irreversibility of feedback, but this evaluation provides information which is necessary for organizing payment for labor. Without this, any system will operate with difficulty and with interruptions.

#### Dynamism, Fast Action and Reliability

Scientific and technical progress is constantly making changes in the nature and conditions for labor by raising the level of technical support. For example, at the Minsk engine plant under the 10th Five-Year Plan alone the value of equipment, machines and mechanisms per one worker almost doubled, and at the motor scooter plant, the refrigerator plant, and the Luch footwear association it increased more than 1.5-fold. Labor productivity is increasing and, consequently, it is becoming possible to raise the level of payment per unit of time worked.

And in this connection the following ideas come up. Since working conditions change, why not retain from the present wage rate system only the coefficients, that is, the ratios of the hourly earnings for work requiring various qualifications? And the hourly earnings would be increased annually, according to the way the average monthly earnings increase from year to year. In Belorussian industry in 1979 they were 161.7 rubles per month, in 1980 -- 165.8, and in 1981 -- 169.3. For the 1979 decree concerning improvement of planning stipulates that the wage fund should be dependent on the volume of output and not on the number of workers. Hence the logical expediency of making sure that the amount of payment per hour or month of time worked is determined by the enterprise on the basis of the plan for output of products and the planned number of industrial production personnel.

It is necessary for the wage system to be dynamic so that it will become a real feedback factor in the mechanism for controlling production efficiency. In the speech of General Secretary of the CPSU Central Committee, Comrade K. U. Chernenko, this problem was raised as pointedly as could be: "People may say: but even now we can penalize negligent workers by means of the ruble and reward the conscientious ones with bonuses. That is the way it is. But apparently the penalties have not been severe enough so far, and the material incentives have lacked the proper fairness and sometimes, if you will, also the proper generosity."

The requirement for fast action of feedback, including changes in the level of wages, seems obvious to me. Frequently a late reaction is worse than none at all. The situation changes and those who have their hands on the controls are "out of sync": after good work they give penalties, and after bad work they give incentives. It is precisely this kind of delay that is envisioned by many of the systems for awarding bonuses to engineering and technical personnel. A large amount of lapsed time between the work and its results (and the bonus is paid for the results) not only weakens the cause and effect relationship, but sometimes eliminates any motivating influence the bonuses may have. A designer of an automotive plant, for example, is working on a vehicle which will be produced in 3-4 years, but he receives a bonus for the results of the association's current production activity.

Among the other requirements, the reliability of feedback is especially important, the more so with such a variety of it as wages. It would therefore be good to "inspect for durability" the system of wages and bonus provisions, and to establish some kind of business games, involving all categories of interested parties in them. In the game, some of the people could think of clever ways of "side-stepping" the system while others could develop countermeasures. The reliability of wages as a factor in feedback consists also in that when all of the previously set conditions are met, the incentive should be guaranteed. On the other hand, it is necessary to ensure the irreversibility of the punishment, fully in keeping with the established system of material, administrative and other kinds of responsibility.

A Word is just a Word, But Still ...

There are kinds of work from which the product is intangible. Therefore this product -- the spoken word, which, as we know, flies away -- cannot be pinned



down. For the school teacher, the institute instructor or the lecturer of the Znaniye society, the word is the basic and main product. For the salesman in a store or the consumer service receiving clerk, the word is a significant part of the product. Therefore we take not only our purchases from the store, but also this "intangible" product which is sometimes more solid than brick.

I would install microphones in the work positions of certain workers of the "conversational genre" and direct the verbal product into the office of the director. Just as they record the dialogues between a pilot and the ground control. Of course, in that case the conversations are especially important. But if one thinks about it, the "conversation" between a salesman and a customer is also of some importance. People should not eavesdrop on private conversations, but the kind of checking on work which is done by the technical control department at a plant does not offend anyone.

And how the art of service would advance from just the presence of such an "anti-boor-ophone" in the working position -- for one could never tell whether it was turned on or not ...

Whether we are caught up in business affairs or in the sphere of services, complaints arise from time to time (sometimes more often than we would like).

Once I had to spend a couple of months in a traumatological hospital. Every morning the physician in charge, V. M. Sosnovskiy, would come to our ward and ask: "No complaints other than about fate?" On Mondays the docent, V. P. Kostyuk, would come with a group of students and ask: "What are your complaints?" Once a month the professor, A. S. Kryuk, would visit the patients and, from the height of his professorial rank, would ask the same question.

And it came to me: what if this system were in effect in all of our life! Well, I am not predicting the forms of gathering complaints. Perhaps we could introduce forms for complaints and a unified policy for originating them. Such unified forms would make it possible to use computers to check on the origin of the complaints, to group and analyze them, and to develop measures for eliminating common causes. Regarding this, of course, one could say: "Do we really not have enough paperwork, so that you want to bureaucratize this too? There will be no time left for work ..."

"Regulation and order," wrote K. Marx, "are a form of social organization of a given method of production and therefore its relative emancipation from simply chance and simply arbitrariness."<sup>1</sup>

And, after all, the work consists in providing for diverse, flexible, fast-acting and reliable feedback.

When considering the feedback mechanism one cannot say that there is no protection for those who have been unjustifiably punished or that those who have been elevated in excess of their merits are not brought back down again. But it is certainly not always the case that the reaction goes beyond the concrete incident. A person who is guilty of violating feedback frequently



remains in the shadows, or in the extreme case receives a reprimand -- the lightening rod of feedback.

And yet the need for a radical improvement of the mechanism and methods of management is dictated by life itself. "It is necessary to create conditions -- economic and organizational -- which would stimulate high-quality, productive labor, initiative and enterprisingness. And, conversely, poor work, inactivity and irresponsibility should be directly and irreversibly reflected both in the material remuneration and in the job position and in the moral authority of the workers" -- this is how the problem was formulated at the November (1982) Plenum of the CPSU Central Committee.

My remarks are perhaps not irreproachably substantiated -- and that is what this is all about.

#### FOOTNOTES

1. Marx, K., Engels, F., "Soch." [Works], Vol 25, Part II, pp 356-357.

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## ROLE OF SMALL-SCALE PRODUCTION UNDER SOCIALISM DESCRIBED

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[Article by N. L. Lushina, candidate of economic sciences, Institute of Economics of the World Socialist System of the USSR Academy of Sciences (Moscow): "Small-Scale Production in a Socialist Economy"]

[Text] In the 1970's the majority of countries began to search seriously for new reserves and factors for effective growth of public production. Various kinds of measures are being taken to concentrate forces in the decisive areas of economic construction and to increase the effectiveness of the utilization of material, labor and financial resources. Here major significance is attached to accelerating scientific and technical progress as the main factor in intensification of production, improving the economic mechanism and deepening economic cooperation among the CEMA countries.

In addition to this, in a number of socialist countries at the end of the 1970's and the beginning of the 1980's more attention was paid to the possibilities of active utilization of small-scale production in public interests. At the same time they adopted corresponding legislative acts and decrees to regulate the conditions for its functioning and development, and the means and forms of interaction with large-scale socialist production.

This line is not principally new. Throughout the course of past decades it has been wavelike in nature: it would die down, and then it would gather force again; and there has been a search for more expedient forms and methods of utilization of small-scale production, including private, small-scale commodity production.

The following argument is usually used to justify this line: large-scale production comprises the undoubted basis of the socialist economy and above all its base branches, but it cannot always satisfy the entire diversity of individual needs, especially under the conditions of their continuously increasing differentiation, and it cannot keep up with the fluctuations in consumer demand and the "caprices" of fashion. Since many human needs are mainly individual, they can be satisfied more simply not by large enterprises with mass production, but by small ones, particularly those which use small cooperative, family or individual labor. We are speaking primarily about

branches which serve the population directly: individual construction, repair of housing and household appliances, sewing and repair of clothing and footwear, care for the ill and aged, and so forth. As world experience shows, small-scale production facilities are economically expedient in small-series and auxiliary production in industry, in certain branches of agriculture and the agro-industrial complex as a whole (including the processing of agricultural products), in certain kinds of transportation and in retail trade. It is thought that in these spheres small production facilities sometimes help to solve important socio-economic problems:

without significant capital investments it is possible to significantly expand the production of many consumer goods and services, reacting flexibly to the changes in the market demand. Small local sources of raw material and wastes from large-scale production are used more extensively;

production, and especially the sphere of services, employs pensioners, students, housewives, invalids and people who wish to work after putting in their basic work time, that is, all those whom it is difficult to use in large-scale production because of its technological peculiarities;

the production of goods and services is brought closer to the consumers, which is especially important for residents of small cities and rural areas, transportation expenditures on delivering goods from large industrial centers to the outskirts are reduced, and the living conditions for people living in population points of various sizes are equalized somewhat;

favorable conditions are created for placing the labor force which is released by large enterprises which have increased the effectiveness of their utilization of labor force, and also the labor force in certain countries (Vietnam, China and parts of Cuba) which is unemployed because of the limited amounts of capital investments, energy resources and many kinds of raw material for large-scale production;

there is a more complete and effective utilization of the unique capabilities, knowledge and labor skills of individual citizens, from whom a complete output is not always stimulated by the organization and wages at large enterprises;

a positive alternative to underground "business" is created, through the improvement of legal and economic conditions for the activity of individual producers who are working legally, along with the simplest forms of their cooperation.

In socialist countries there are small enterprises in all sectors of the national economy -- state, cooperative and individual -- but they have been developed mainly in the last two. These include handicrafts and cottage industry, individual performance of services, individual peasant farms, the subsidiary activity of workers of the state and cooperative sectors during their free time, small cooperative societies of individual producers, the work of individuals or small cooperatives on a rental or contractual basis under an agreement with enterprises or organizations, and so forth. Frequently all of these kinds of activity are combined under the general concept of the "private sector." In our opinion, this is incorrect since far from all of them are

private in terms of their socio-economic nature. If one must have generalizing concepts, in this case the following would obviously be more acceptable: "individual labor activity" or "the individual sector." And within these frameworks one should single out actual "private activity" or "private enterprise," having worked out beforehand the scientifically substantiated criteria for calling one kind of labor activity or another private. But there is not a sufficient justification for expanding this kind of small-scale production into a special sector in countries that have constructed the bases of socialism because it comprises an insignificant proportion of the overall volume of national production.

In countries that are included in the world socialist system there are the following forms of individual production, which are distinguished by their socio-economic nature.

#### Small-Scale Private Enterprise

This is an independent sector in the mixed economies of certain countries (China, Vietnam, Laos), which is in a transition period. Its existence and tendencies for development, including the potential for the appearance of capitalist exploitation, are determined by the objective laws of the given period. Therefore this sector cannot be eliminated legally without harm to the country's economic development until after the completion of the basic transformations which are inherent in the transition period. At the basis of private enterprise lies private ownership of the means of production (as a rule, small-scale) and hired labor is allowed on a limited scale.

#### Small-Scale Private Production of Goods and Services

This form exists to an insignificant degree in countries that have constructed the bases of socialism: Bulgaria, Hungary, the GDR, Romania and Czechoslovakia. It is based on small-scale private ownership of the means of production and independent economic activity. Of the five countries, only Hungary and the GDR allow the use of hired labor in strictly limited amounts: in Hungary -- up to three people in individual handicraft, trade and consumer service enterprises and up to 12 people in the so-called management labor collectives; in the GDR -- up to 10 people.

Small-scale private production in Poland and Yugoslavia requires a special evaluation. It has turned out historically that in these countries private peasant farms create the vast majority of agricultural products (in Poland -- about 80 percent of the commercial products, and in Yugoslavia -- about 70 percent of the total final product). But in the cities, as in other European socialist countries, private enterprise does not play a significant role.

In Poland, according to new legislation, it is permitted to use up to 15 hired workers. In Yugoslavia, up to 5 can be used (in seasonal agricultural work a larger number of workers may be used, but not more than 100 man-days).

It should be emphasized that the maximum norms allowed by law for the utilization of hired labor are not utilized to the full extent in a single European socialist country. As practice shows, the private producer prefers



the family form of labor organization. Thus in the GDR, instead of the permitted 10 hired workers, one private enterprise has an average of 1.6, in Hungary -- 0.2 (instead of 3), and in Yugoslavia -- 1.5 (instead of 5). The picture looks similar in Poland as well. If the technology requires a larger number of workers than is allowed by the size of the family and the number of students permitted by law, small-scale commodity producers prefer to band together into small cooperative societies. The profit that is received and the responsibility for the final results of the economic activity are distributed proportionally among the members of the society, which does not happen when hired labor is used.

The existing hiring conditions do not stimulate the use of hired workers either, since the private businessmen must pay a fairly high tax for each hired worker into his social insurance and social security. Moreover, a private businessman can attract workers to his enterprise only by paying a higher wage than the worker would receive at enterprises of the public sector since work in a private shop, according to the opinion that has taken hold in the socialist society, is less prestigious than that in a state or cooperative enterprise. Moreover, as a rule, it is more intensive. All this increases the expenditures on hiring to such an extent that private businessmen turn to it only in extreme cases. In certain countries (for example, Hungary) private businessmen who use hired labor have fewer social benefits than those who do not have hired workers. This also reduces the motivation to use hired labor.

Nonetheless, the very fact that hired labor is used by small-scale commodity producers should be regarded as one of the criteria for considering their activity private.

There is reason to assume that private enterprise with the application of hired labor force in countries that have constructed socialism has considerably lesser prospects than does individual labor activity which is based exclusively on one's own labor or that of one's family.

#### Individual Production

In countries that have completed the construction of the fundamentals of socialism, it is represented in the following forms:

farmsteads of cooperating peasants and the subsidiary farms of workers in the state sector;

additional work under contract or hire during time when not working in the public sector;

family enterprises working under a lease or on a contract basis in cooperation with enterprises or organizations of the state or cooperative sector.

In recent years, there has been active development in leasing the means of production from the state or the cooperative under an agreement. The agreement is concluded by one individual or a group for performing one kind of labor activity or another, most frequently in the sphere of service or retail trade. Enterprises which are usually unprofitable are turned over for lease

by competition. They have been unprofitable, in particular, because they have not engaged in series production and mechanization is complicated. As a result, there is a prevalence of manual, less productive labor, a poor quality of products that are produced there, a system of wages that does not stimulate increased labor productivity, and so forth. The conditions for competition in some countries (for example, Hungary) are so strict that in many cases it is difficult to find people who wish to take the lease.

In addition to members of his family and students, the lessee is permitted to hire several workers (in Hungary -- 6 family members, 3 students and 3 hired workers or home workers). This form of individual labor activity is not private, for it is based on the utilization of means of production that are owned by the state or cooperative. Leaving the functions of authority in their hands makes it possible to dissolve the relationship with the lessee (individual or collective) at any time if he has violated the conditions of the agreement. Even if the lessee is contributing his own capital to the development of production, that amount, as a rule, is not commensurable with the value of the leased capital, and therefore this circumstance does not principally change the nature of the property relations. According to the policy which exists in the majority of countries which have this kind of leasing, the state or the cooperative does not bear material responsibility for the operation of the production facility which is leased. This is placed fully on the lessee, right down to the loss of his own personal property in the event that the given enterprise goes bankrupt. Hired workers employed in these enterprises receive wages from the lessee which are somewhat higher than for similar workers in the state sector, but, as a rule, they are less than those of the lease holder. They do not bear personal responsibility if the enterprise goes bankrupt.

In all the countries this specific form of production is thought to have prospects for existence and further development.

The scale of the utilization of individual labor activity (including private enterprise) on the whole is not large in the European socialist countries at the present time. Thus in 1981 the individual sector (not including private subsidiary farms) accounted for 0.5 percent of the national income in Czechoslovakia, Hungary -- 3.0 percent, the GDR -- 3.5 percent, Romania -- 4.5 percent, and Bulgaria (including private subsidiary farms) -- 9.0 percent. At the same time in Poland it was about 18.0 percent, and in the total final product of Yugoslavia -- 12.6 percent.

According to the prediction for the foreseeable future, the proportion of the industrial sector (including private activity) in the national economies of the majority of socialist countries will increase, but insignificantly. The most promising are the forms of industrial labor activity which are realized on the basis of the closest production integration with the public sectors. It is thought that they must be utilized throughout practically all of the course of socialist development.

## Small Cooperatives

Along with individual production, the role of small cooperatives is increasing in socialist countries. They are distinguished from large cooperative enterprises by their considerably greater economic independence, the financial risk, the direct dependence of personal incomes on the final results of the production activity, and the simplified system of accounting and accountability. Thus in Hungary, in keeping with the decrees adopted in 1981-1982, it is possible to create small cooperatives (from 15 to 100 people) and specialized groups which operate both independently and within the framework of large cooperatives; the members play a larger role in creating the initial property; and a system of material liability has been introduced for the fulfillment of commitments and the payment of debts of the cooperative or the cooperative group from part of the remuneration for labor, or a share or special-purpose contribution. Some of the profit is distributed according to shares, but it cannot exceed 8 percent of the share or special-purpose contribution (which is only 1 percent more than the payment on limited-term deposits in savings banks). These cooperatives employ both their own permanent workers and home workers, and also people who take on work during the time they have free from their basic employment.

Although the working conditions in small cooperatives are distinguished by specific features, the ownership of the means of production they use is collective, and therefore there is no doubt about the socialist nature of these enterprises.

## State Control Over the Activity of Small Enterprises

All forms of individual and small-scale cooperative activity in socialist countries are permitted by legislation. Small-scale producers organize their activity independently in all stages of production. Their work is not planned from above, but is only directed toward solving economic problems which are determined, as a rule, by the local agencies of state authority.

Socialist countries are improving the system of taxing small-scale commodity producers and the system of state and public control over the financial results of their activity. The more effective these systems are, the more difficult it will be to acquire excessively high incomes. But if there are shortcomings in them, when market conditions are unfavorable private entrepreneurs will be able to dictate their own conditions to the consumer, thus bringing excessively high profit.

The experience of several countries shows also that the functioning of small enterprises frequently creates several material incentive systems in the economy. This serves as a precondition for an undesirable movement of part of the labor force from large enterprises to small-scale production. Sometimes labor discipline decreases, especially among workers with two jobs, the drive for high incomes becomes more active, and so forth. There is frequently dissatisfaction when the incomes of individual producers are higher than those of similar workers in the public sector.



All this shows that there is a need for a well-thought-out and attentive attitude toward the activity of individual commodity producers and the simplest forms of their cooperative associations on the part of the communist party and the state. State regulation of their activity requires well arranged control (primarily along the lines of taxes and prices) and the organization of effective current supervision over the observance of legislation that regulates the various aspects of the activity of these producers.

The concrete forms and methods of state regulation and control differ in various countries. Thus in the GDR, preference is given to centralized methods of managing small-scale production and to closer coordination of the activity of small enterprises in the individual sector and large-scale state and cooperative production. In Hungary, where the forms of small-scale production are especially varied, they are constantly looking for new forms and improving existing forms not only of state, but also of social control over the activity of small-scale producers and labor societies. The activity of such organizations as the KIOS (organization of small handicraftsmen) and the KISHOS (organization of small merchants) is of great interest. They function under the direct control of the party and government, and provide economic management in this area. These organizations have their own central agencies. Their functions include: personnel policy (granting permission for production or trade activity to citizens, certifying with documents that they have the necessary education or qualifications); providing producers with orders; assisting in acquiring raw materials and selling products and services; providing for cooperative ties with large enterprises; organizing exports of products to foreign countries; implementing the technical policy (introducing special new technical equipment and technology into small-scale production); organizing information, and so forth. The center regulates the activity of its peripheral organizations and maintains close contact with the Gosplan, the ministries and other state agencies.

While creating the necessary conditions for full-value labor activity of small craftsmen and merchants who are working legally, these organizations are fighting at the same time against underground private enterprise and trade. Thus they are helping the socialist state to eradicate these negative social phenomena.

As we can see, each socialist country is developing its own specific forms and methods of state regulation and control over small-scale production. The utilization of small-scale production in socialist countries is an extremely complicated matter which is not without certain contradictions which are inherent in a mixed economy. The duration and scale of its further development will be determined by the successes of the socialist economy of the country as a whole.

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## BOOK ON DISTRIBUTION OF INDUSTRY REVIEWED

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[Review by N. Ye. Razdina, Ya. A. Mazover, V. K. Savel'yev and T. Ye. Makarova (Moscow) of the book "Problemy razmeshcheniya sotsialisticheskoy promyshlennosti" [Problems of the Distribution of Socialist Industry], a selection of works by Abram Yefimovich Probst, doctor of economic sciences, Moscow, "Ekonomika", 1982: "A Contribution to the Theory of Distribution of Industry"]

[Text] Prof Abram Yefimovich Probst, doctor of economic sciences, (1903-1976) was a most eminent economist and an outstanding specialist in the area of the theory and methodology of distribution of productive forces and territorial organization of public production and the development and distribution of the fuel and energy complex. Probst's creative legacy includes about 400 scientific works. Concerning his book "Razmeshcheniye sotsialisticheskoy promyshlennosti. Teoreticheskiye ocherki" [Distribution of Socialist Industry. Theoretical Essays] (Moscow, Ekonomizdat, 1962), Academician S. G. Strumilin wrote that it "has special merits and will occupy one of the leading places in the literature for a long time to come."

The range of Prof. Probst's scientific interests is unusually broad: the theory of crises and reproduction, problems of the market, K. Marx' theory of value and theoretical justification for certain questions related to calculating production costs, questions of the theory and methods of long-range planning, the economic effectiveness of territorial organization of production, new technical equipment, capital investments, and so forth. At the same time, A. Ye. Probst was seriously engaged in research on the history of the organization of coal mines and the appearance of the coal industry in Russia in the 18th century, the timber and fuel policy of Peter I, the history of the organization in Russia of petroleum extraction and processing, the petroleum industry in the North and so forth. And, of course, the main things in his legacy are his remarkable works on the theory and practice of distribution of productive forces and on regional problems of the Soviet economy.

For many years A. Ye. Probst participated actively in solving the most complicated problems of the development and distribution of branches of the fuel industry and the rearrangement of the structure of the fuel and energy balance of the country and individual regions in the traditional stages of their development. He created an area of scientific research which is related

to the energo-economic characteristics of the regions and the regionalization of fuel consumption. It became the basis for subsequent works on optimization of the fuel and energy complex, and also on evaluating its influence on the development and distribution of productive forces and the production specialization of the regions. From the time of the founding of the Kharkiv Coal Institute in 1928, A. Ye. Probst was in charge of the work here on the regionalization of the fuel supply. In 1930 he defended his dissertation, "Questions of the Distribution of the Coal Industry," and from 1931 on he was in charge of work in Moscow for regionalizing fuel consumption, first in the Institute of Power Engineering and Electric Power Networks and then in the Thermotechnical and the Power Engineering institutes of the USSR Academy of Sciences.

Prof Probst participated actively in work of the First and preparations for the Second All-Union Fuel Conference, presenting papers entitled "Problems of Local Fuels," "The National Economic Cost of Fuel," "Toward a Solution to the Problem of Regionalizing Fuel Consumption in the USSR," and others. In 1938 he defended his doctoral dissertation on the subject "Basic Problems of the Geographical Distribution of the Fuel Economy in the USSR." The work was published in 1939 by the publishing house of the USSR Academy of Sciences in an "abridged" variant consisting of 35 printers' sheets. A. Ye. Probst returned repeatedly to the problems presented in it, which enabled him to develop comprehensively the theoretical and methodological foundations of the energo-economic characteristics of the regions and also an elaborate system of its technical and economic indicators for the beginning of the 1960's. They were reflected in the aforementioned book "Razmeshcheniye sotsialisticheskoy promyshlennosti. Teoreticheskiye ocherki."

The book has not lost its scientific and practical significance even today. Under the leadership of Prof Probst, methodological provisions were developed for determining the relative economic value of various kinds of fuel, and relative technical and economic indicators were calculated for coal, gas, peat, shale and mazut at the points of consumption. These became the base indicators for determining the directions for renovation of the country's fuel and energy complex in the 1950-1960's. On the basis of the energo-economic characteristics of the regions, a comprehensive evaluation was made of the influence of the fuel and energy complex on the development and distribution of the country's productive forces and the production specialization of individual economic regions. The description became the scientific basis for more efficient distribution of productive forces and the formation of the production specializations of the eastern regions, primarily Siberia and Middle Asia, for the extraction of fuel and the production of energy-intensive products. Referring to the limited quantities of economically effective fuel and energy resources in the European zone, A. Ye. Probst even at that time spoke of the need to limit the distribution of energy-intensive industries here. Also of principal significance were his works devoted to the national economic effectiveness of revamping the country's fuel balance, economizing on fuel, and determining the role of reserves in national economic planning.

Beginning in the 1930's, A. Ye. Probst was an active participant in the development of five-year and long-range plans for the development of the national economy, and he was also on many state commissions and boards of

experts for solving large national economic problems, including the development of the fuel and energy base for the USSR. During the Great Patriotic War he worked on a commission for mobilizing for defense needs the resources of the Urals, Siberia and Kazakhstan, and he was a member of the bureau of this commission and the leader of its fuel group. For his work to develop the fuel economy of these regions he was awarded the USSR State Prize. During the more than 30 years of his scientific activity he was associated with the Council for the Study of Productive Resources [SOPS] of the USSR Academy of Sciences and then the USSR Gosplan. As the head of the Leningrad-Murmansk expedition, in conjunction with Academician I. P. Bardin, he demonstrated the expediency of creating a northwestern metallurgy industry, as the result of which a decision was made to construct the Cherepovets Metallurgical Plant.

When working on the Council for the Study of Productive Resources under the USSR Gosplan, Prof Probst participated actively in all-union and republic conferences on the development of the productive forces of the regions: Eastern and Western Siberia, Kazakhstan, the republics of Central Asia, the Far East, the Northwest, the Ural-Volga and others. In other words, there is practically no single region in the country with a large fuel base in whose development he did not participate. A. Ye. Probst repeatedly traveled to international energy congresses and his works were widely known abroad.

A. Ye. Probst devoted constant attention to the theoretical and methodological problems related to the distribution of productive forces and the effective territorial distribution of production. This was most clearly manifested in his evaluation of the interaction of individual factors and regional peculiarities in the distribution of various branches of industry.

A. Ye. Probst's theoretical works have retained their scientific value and timeliness to this day and are used by scientific and practical workers, graduate students and students of economics VUZes of the country. The publication of his selected works evoked a great deal of interest.<sup>3</sup> It includes works on theoretical questions of the distribution of productive forces. Unfortunately, its small size (15 printer's sheets) made it impossible to present the author's works on this subject completely enough.

The edition is based on the book "Razmeshcheniye sotsialisticheskoy promyshlennosti. Teoreticheskiye ocherki." It also includes chapters from the books "Voprosy razmeshcheniya sotsialisticheskoy promyshlennosti" [Questions of the Distribution of Socialist Industry] (Moscow, "Nauka, 1971), "Effektivnost' territorial'noy organizatsii proizvodstva" [The Effectiveness of Territorial Organization of Production] (Moscow "Mysl" 1965) and a number of articles. Despite a certain fragmentariness and unavoidable repetitions in certain parts, the book is undoubtedly of interest. Especially interesting are the theoretical points concerning the development and distribution of productive forces.

The first chapter is devoted to questions of the general theory of distribution (the statement of the problem, its significance and theoretical foundations). The importance of the territorial aspect in the development of public production is emphasized here. The author discusses the need to take



economic laws into account during the territorial organization of production and to deal with the specific features of individual branches of the national economy, industry, transportation and so forth which determine the unique economic processes in each branch.

In the second chapter, he determines the economic effectiveness of variants of the distribution of industry. While emphasizing the unity of the methodology for determining the relative economic effectiveness of different variants of capital investments, new technical equipment, technology and the organization of production and its geographical distribution, at the same time the author takes note of the existence of a number of concrete and particular features for calculating them. A great deal of attention is devoted to improving the methods of quantitative measurement of the economic effect from efficient territorial organization of public production.

The need to account for branch and territorial features in the distribution of individual industries and efficient territorial organization of production is demonstrated in the third chapter from the example of the influence of energy engineering on the distribution of industry. Taking into account the all-embracing and universal nature of energy engineering ties, he comprehensively analyzes the influence of this factor on the distribution of branches of industry and the production specialization of individual regions.

The comparative energo-economic indicators for individual branches of industry that are presented in the text, in spite of how old they are and the change in the absolute amount of energy expenditures, provide a correct idea of the degree of influence of energy engineering on the economies of individual groups of branches and, in the final analysis, the influence of interregional differences in the cost of fuel and energy on the distribution of individual production lines. A large amount of space is devoted to an evaluation of the influence of energy engineering on the forms of social organization of production and to the leading role of energy engineering in the production specialization of a number of regions and in the interregional distribution of industrial energy complexes. Of undoubted interest is the methodology for the energo-economic characteristics of the regions and the system of indicators that reflects it.

In the fourth chapter, they have reproduced an essay on determining the economic effectiveness of the region's production specialization. After discussing the corresponding technical and economic indicators suggested by a number of authors, A. Ye. Probst analyzes them from the standpoint of a unified criterion of economic effectiveness, namely, the productivity of public labor. The economic effectiveness of the production specialization of each region is determined from the standpoint of the entire national economy, that is, in coordination with the effect from the specialization of other regions. A correct determination of the economic effectiveness of production specialization is based on comparable technical and economic indicators of the production of one and the same product in various regions.

After a discussion of the economic effectiveness of interregional division of labor, production specialization and comprehensive development of productive forces of each region, the book raises questions of efficient distribution of



individual enterprises within the region, that is, intraregional organization of labor. The transition from isolated distribution of individual enterprises to group distribution, which forms territorial production agglomerates (production-territorial complexes of various ranks) is the subject of the next chapter.

The distribution of a group of enterprises in one geographical point or on one compact territory can take place in various forms of public organization of production (industrial centers, territorial-production complexes and so forth). While there is a certain lack of precision in defining territorial-production complexes (the author uses the term "production-territorial complex"), their boundaries and their ranks, the comprehensive analysis of the main factors in increasing the effectiveness of this form of territorial organization of production is interesting. And A. Ye. Probst considers the economic effectiveness not only of the combination in one point (industrial centers, PTK [industrial-technical courses], and so forth) of interconnected and mutually supplemental production lines, but also the effectiveness of their cooperation in creating and operating a joint production and social infrastructure. He has developed a scientific approach to the quantitative measurement of the economic effect from bringing industrial enterprises closer together in space and from creating production-territorial complexes.

The sixth chapter of the monograph is devoted to methodology problems in long-range planning of the distribution of socialist production. A. Ye. Probst devoted several works to this subject. The chapter was written with respect to drawing up a general plan for the development and distribution of productive forces during 1971-1980, but the majority of its initial and methodological points are still timely and were used for developing methodological provisions of the General Plan for 1981-1990 and subsequent periods.

The last two chapters elaborate and refine to a certain degree a number of previous points. Additionally, they contain practical recommendations which are an elaboration of the theoretical and methodological points about improving territorial organization of public production and increasing the economic effectiveness of socialist production.

The compilers of the book were faced with the difficult task of selecting the most valuable works from all of Prof Probst's immense creative legacy and retaining a certain sequence and integrity of presentation, which, it seems to us, they managed to achieve. Nonetheless one might regret that many works were not included in the book, especially the last articles of A. Ye. Probst, particularly "Industrial-Economic Complexes" (IZVESTIYA AN SSSR, SERIYA GEOGRAFICHESKAYA, 1976, No 2), "On Territorial Planning and Optimization of the Structure of the Economies of Regions" (EKONOMIKA I MATEMATICHESKIYE METODY, 1974, Vol X, Issue 1), "An Economico-Mathematical Analysis of the Distribution of Productive Forces" (IZVESTIYA AN SSSR, SERIYA GEOGRAFICHESKAYA, 1973, No 6), "On the Long-Range Prospects of the Distribution of Production" (VOPROSY EKONOMIKI, 1973, No 5) and many others.

Prof Probst was also a teacher and a friend of youth who all his life combined scientific activity with pedagogical work, devoting a great deal of effort and

knowledge to the training and education of young scientists. He had immense respect for his students, and saw and respected them as like thinkers.

The publication of the selected works of A. Ye. Probst is a token of gratitude to the memory of this great scientist-economist who throughout his life was an example of a creatively thinking and productively working scholar.

#### FOOTNOTES

1. VOPROSY EKONOMIKI, 1962, No 8, p 113.
2. See PLANOVOYE KHOZYAYSTVO, 1967, No 7 and VOPROSY EKONOMIKI, 1970, No 12.
3. Probst, A. E. "Problemy razmeshcheniya sotsialisticheskoy promyshlennosti". Moscow, "Ekonomika", 1982.

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#### BOOKS BY DIRECTORS OF NEIGHBORING ENTERPRISES REVIEWED

Novosibirsk *EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA* (EKO) in Russian No 5, May 84 pp 180-182

[Review by B. P. Kuttyrev, candidate of economic sciences, Institute of Economics and Organization of Industrial Production of the USSR Academy of Sciences (Novosibirsk) of the books "Delo, kotoromu sluzhish'" [The Cause Which You Serve] by P. V. Buderkin, Omsk, Omskoye knizhnoye izdatel'stvo, 1982, 128 pages, and "Na orbite pyatiletki (opyt raboty Omskogo proizvodstvennogo khlopchatobumazhnogo ob'yedineniya "Vostok") [In the Orbit of the Five- Year Plan (Work Experience of the Omsk "Vostok" Cotton Fabric Production Association)], Moscow, "Legkaya i pishchevaya promyshlennost'", 1983, 72 pages]

[Text] These two well-known enterprises are located across the street from one another in the industrial region of Omsk. They say that it is impossible to separate them by fences: one of them simply does not have a fence. It is surrounded by a park which contains lanes, benches for resting, and a rotating Board of Honor of leading workers. One of the enterprises is the Omskshina production association, the other is the Vostok cotton fabric production association. Their general directors, Petr Vasil'yevich Buderkin and Ivan Il'ich Podkovka, write about their collectives.

The question may arise: why were these two specific enterprises (and, correspondingly, books) selected for the review? Certainly not because their windows look out on one another? Omskshina belongs to heavy industry and Vostok -- to light industry, and this is a principal difference. Their "physical potentials" are also different: one employs mainly men, who sometimes must be athletes, and the other -- the "weaker sex." There are also other differences. Thus what joins these two collectives together is even more essential.

This thing that they have in common is mainly the planning of social development, which is tantamount to conscious control of the "human factor" in production. "You always feel better when you help a person with something. Even if it is something trivial," -- such is the credo of P. V. Buderkin (p.36). During the time when the general director receives visitors, all the shop chiefs and head specialists are to be in their offices -- so that the requests can be considered as efficiently as possible. And many requests are

related to housing, daily life, work, culture, in a word, social development. But requests and suggestions are not only heard: they are foreseen, because this is what social planning is all about.

Omskshina is among the leaders of the movement for planning social development. The association has already approached the point where it has no funds left for constructing new social and domestic facilities -- they are going for the repair and operation of existing ones.

Vostok is 40 years old and the collective has been planning and carrying out its own social development for more than half of this time. This association has also come up against problems with renovation. After 1968 it held class positions in all-union and all-Russian competitions in the branch for 44 quarters in a row. It was not until after an interruption that Vostok again began to win its usual positions. The association has received the title of an enterprise with a high culture of production.

Renovation is a difficult, but at the same time beloved brainchild of both general directors. Its attraction is eloquently described by P. V. Buderkin in a separate chapter entitled "A Battle on the Way." I. I. Podkovka's book does not have a special chapter like this, but all of the chapters are devoted in one way or another to renovation: "Technical Progress," "Introduction of the Brigade Form of Organization and Stimulation of Labor," "The Introduction of Advanced Practice," "Improvement of Working and Living Conditions." Regardless of the difficulties the authors may have discussed, one gets the impression that for them social development means continuous comprehensive renovation: technical, technological, economic and organizational -- one large battle for improvement of all aspects of the vital activity of the collective, including social. Without this, these two enterprises would probably be unthinkable.

From P. V. Buderkin's book: "'Thus,' -- I tried to give my voice sufficient decisiveness, 'point one: we shall proceed toward renovation while fulfilling the plan.' 'And if we are given another additional assignment?' -- 'Then we shall fulfill the additional assignment as well!'" (p. 103). This has become the principle for the operation of both associations: renovation without skimping on the plan, and this means typical, not extraordinary, everyday work. This corresponds fully to the peculiarities of modern production, which is changing with increasing rapidity. And what are the results? The renovation of the assembly shops, for example, made it possible to more than double the production of tires for "Urals" and trailers for K-700 and K-701 tractors. In 1982 the Vostok association produced 31.7 percent more products than in 1975, and the number of personnel remained the same.

Without paraphrasing the content of the books, let us note two differences between them. P. V. Buderkin writes more about management activity. "The labor of the director," he notes, "is so complicated and unique that it requires the renunciation of many benefits ... How does one compensate for such immense expenditures of spiritual and mental energy of everyday stress? -- Only by an awareness that they are not in vain and they are working for the common cause, the success of the collective. Herein lies immense joy for the director as well" (p. 29). The conclusion is drawn that experience makes it



possible not only to correct mistakes, but also to avoid them. I. I. Podkovka writes about the Vostok collective, expressing her strategy and tactics for social management through what has already been done and achieved.

The second difference arises again from the fact that they belong to different branches. The textile workers, as distinct from the tire manufacturers, have built everything they have themselves, by using internal forces. This is no reproach to Omskshina -- such is the specific nature of the branch. The women of Vostok have forged their good fortune with their own hands, without specialized contractors and without limits. The directors of many enterprises of the branch have been brought to this enterprise and shown: learn how to manage and how to be concerned about people when there are no reserves of any kind. I. I. Podkovka has relied on an inexhaustible resource -- people.

Read these two different, interesting books. They contain both management experience and social optimism.

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#### EKO READERS' CONFERENCE HELD IN IVANOV

Novosibirsk *EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA* (EKO) in Russian No 5, May 84 pp 183-184

[Article by B. D. Babayev, head of the department of labor economics of the Ivanovo State University: "Readers' Conference in Ivanovo"

[Text] The conference of EKO readers took place within the walls of Ivanovo State University. Also participating in it were representatives of other VUZes, industrial enterprises and city organizations. The discussion about the magazine was opened by the deputy editor-in-chief of EKO, Doctor of Economic Sciences B. P. Orlov.

The general director of the Ivanovo machine tool building production association, V. P. Kabaidze, wished that the economic press would unmask the myth about the shortage of labor force, "for in places where one person would be enough if there were good organization of production and labor and normal intensiveness, today it takes several people to do the work, and requests are still coming in for additional labor force."

"The country," the speaker continued, "produces about 200,000 metal processing machines annually, but only 5 percent of these machines have numerically programmed controls. Therefore the growth of the stock of machine tools makes it necessary continuously to increase the number of workers. It is necessary to sharply improve Soviet machine tool building" -- thus V. P. Kabaidze concluded his statement. Participants in the conference did not object to his statement that we frequently save "on matches" when we should be saving on more costly items. Another crucial problem is that of the effectiveness of capital investments in the machine tool building industry. Enterprises that produce traditional equipment are providing much less of a return than those in which progressive technical equipment is created. Yet there is no large difference in the amounts of capital investments they receive. The press plays a large role in resolving these contradictions.

Z. I. Reynus, a university professor, emphasized that articles in the magazine influence the awareness of the readers only when they force them to think. Under modern conditions, from his point of view, one of the largest problems of economic theory and management practice is the problem of criteria and indicators of the effectiveness of production. The USSR Gosplan recommends as

generalizing indicators primarily the indicators of growth in national income per capita and growth of its volume per 1 ruble of expenditures. But these indicators have different dynamics. It is necessary to have a series of articles on this problem, and it is especially important to show how, with the various areas of the effect of the most important statistical indicators (labor productivity, output-capital ratio, and so forth), it is realistic to calculate the actual level of production effectiveness.

Docent B. I. Kedrov from the textile institute called for the editorial staff to pay more attention to such questions as the decline in the prestige of engineering education and the decreased social activity of a certain contingent of the students. In the interests of increasing the prestige of the engineering vocation, it seemed expedient to the speaker to introduce certification, as has been suggested in EKO and other press agencies: engineers of the first, second and third categories, with the corresponding differentiation in wages.

Ye. G. Grinzburg, a university professor, noted: "When EKO was created, we specialists in the area of production organization were glad that we had finally received 'our own' magazine. But analysis of the problems dealt with in EKO shows that economic and management aspects prevail in it, and questions of the organization of production are poorly represented. It would be useful to increase the interest in this problem, since underestimating production organization retards the growth of the effectiveness of our economy."

At the readers' conference in Ivanovo it was also suggested that we increase the number of articles on exports and imports of industrial equipment, the economics of renovation of enterprises, improvement of the wage system, stimulation of the creative activity of engineers, problems of VUZ training, and the effectiveness of the organization of scientific research work.

On behalf of the editorial staff, Prof B. P. Orlov invited the managers and specialists of enterprises and also scientists who live in Ivanovo to participate more actively in the preparation of articles for the magazine on problems of the national economy that had been discussed at the conference.

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## **FUNCTIONS OF PLANT SOCIOLOGIST SATIRIZED**

**Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 185-188**

[Article by A. V. Khavchin, deputy chief of the division for production work of the oblast trade-union council (Rostov): "The Virtues of the Vicious Circle"]

[Text] The director had tried for a long time to arrange a position for a plant sociologist. Finally they gave him the slot. They also found a young university graduate who had decided to fill this slot.

Upon meeting him, the director said:

"Permanent personnel are our treasure, but they are gradually going on pensions. Try to figure out why youth will not stay with us, what they do not like here. Apparently the main reason is that we are not building enough housing. Give us a solid scientific substantiation for this and then it will be easier to get additional allocations."

The beginning sociologist sweated over this assignment -- he distributed questionnaires, held conversations, and correlated the responses on the computer. And he submitted to the director a report which proved that it was not so much a matter of housing as of the psychological climate. They were not very concerned about newcomers at the plant, and frequently gave them the jobs which paid the least.

"Deep psychology in a shallow place," the director frowned with dissatisfaction. "Theory is good, but we have real difficulties which you still have not been able to see. I explained everything clearly: the entire problem is that the plant is not constructing enough housing. Act in this spirit."

The young specialist tried to object, but then he gave up and started a new report. After a month he submitted it.

"He worked for a month and all he have managed to prove is that we do not have enough housing. We knew that without him!" -- noted the director. "We must think about whether we really need a sociologist at all ..."



## In Spite of Nature

He has a strong-willed, coarsely intelligent face which reminds one of an actor who plays the role of modern managers.

Here is how he conducts a conference.

"Sidorenko, why have you not made the 24-hour schedule? And why were you not at yesterday's planning session?"

Sidorenko rises and like two times two proves that his shop could not meet the schedule. This would have contradicted the laws of nature: there were not enough people, the transportation situation was bad, and they had turned off the power for 2 hours. And yesterday he was dealing with an emergency.

"You, Sidorenko, stop playing the fool and cultivating demagoguery (he pronounces it "dimagogy"). Do whatever you want to, even stand on your head, it does not interest me, but meet the schedule today! This is necessary to the national economy. It is necessary to the country, understand?"

He stares hard at Sidorenko and is silent for a long time.

The most mysterious thing is that the schedule, which in no way could have been met, is fulfilled on the following day ...

## This is What is Meant by a Strong-Willed Manager

"It is a completely unmanageable plant." The head engineer who remained behind after the director left was angry. "We maintain a whole throng of dispatchers, who just increase the confusion. We have a computer, so let us conclude an agreement with the institute and introduce an automated control system, what the hell. Why are we worse than the others?!"

The chief of the information computer center explained:

"In order to draw up a plan for an ASUP [automated enterprise control system], we ourselves must know what we want. How many machines must we actually produce? The basic plan is 200, the plan with the additional assignment -- 210, the plan with adjustments -- 197 ... Then we must teach everybody not to lie. How many machines were made yesterday? If the figure of 300 parts is entered on the invoice, there might actually be either 200 of them or 400 of them. And these will not pass with the computer; it cannot distinguish lies from the truth. In general it is necessary first of all to introduce an elementary order, and then one can go on to the ASUP.

"But if we have this kind of order, why do we need the ASUP," the head engineer threw up his hands in despair.

## When Wits Are Lost

The wall newspaper of the plant administration was a permanent target for jokes from the boys in the design division -- recognized wits. Indeed, what kind of a newspaper was this? The lead article is about the significance of the forthcoming revolutionary holidays. The last column was caricatures cut from old magazines. And in the middle -- a remark about the fact that it is time to bring order into the cafeteria.

The editor, the senior engineer Zaytsev, worn-out by his many public duties, flew into a rage once. Instead of criticizing, you should take over the wall newspaper yourselves, he said. Go ahead -- I'll turn the next issue over to you; just show it to me beforehand.

... And so the next issue that came out was done by people who were recognized to be erudite and witty. It opened with a discussion of how New Years is celebrated in various countries. In the last column were New Years cartoons cut from the pages of old magazines. And in the middle was a sharp critical signal: it is time, finally, to bring order into the cafeteria.

## There Are No Extra People

"And so, Vladimir Timofeyevich, the result of my half year of work. I have carried out your assignment: I have found out how you could release 70 people, almost without any expenditures."

"Well now, well now ... Good man, do not say anything, -- good man! Everything has been substantiated and proved. How many copies of the report have been printed?"

"Three. I have kept one for myself."

"No, my dear, you must give all three to me. And give me the rough draft. I will tear it up, and I will put the report in the safe. And you forget about what you wrote. But you will receive a bonus for your initiative and labor."

"I do not understand anything," said the author of the report.

"But what is there to understand? I have a telegram. Tomorrow we shall have to send 40 people to the kolkhoz. The day after tomorrow ten will go to the vegetable base and seven will be used for cleaning up the area. Who would we send to these places if it were not for these 70 'extra' people?"

"That is, the person who gives us these orders guesses that we have extra people. We must break this vicious circle at some point!"

"Here, sit in my chair, and then break the vicious circle, or jump through it, or stretch it. But I have 3 years left before I receive my pension!"

"Then why do you need my calculations?"

"My but you are a dimwit. In order to keep the shop chiefs on their toes. If somebody starts to complain, I will drag him by the nose to your calculations: I will say, if you start to pester me I will take 15 people away from you!"

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## BONUS SYSTEM REWARDS IDLENESS

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 5, May 84 pp 189-190

[Article by Lev Layner (Moscow): "A Bonus for Doing Nothing"]

[Text] At the beginning of the work day Nikolay Ivanovich, bent over his crossword puzzle, asked us:

"Comrades, does anybody know a five-letter word for spending time not related to work?"

"Rest!" -- we answered in a friendly way, and then returned to our work.

Mariya Ivanovna and Larisa Petrovna were discussing yesterday's television program, Tonechka Kovaleva had settled down to talk on the telephone, and I was engaged in solving a difficult problem which I had found in the latest issue of the chess magazine.

"Rest," Nikolay Ivanovich repeated with relish, and entered the word he had discovered into the boxes. Then he stretched lazily and added:

"It is good when there is no shop chief on a job. But it is not good to go stale. Our Stepan Spiridonovich is ill. We should call him and ask about his health, and it would not hurt to pay him a visit ... "

Having consulted, we decided that staleness would certainly not make our collective look good. Within a minute Nikolay Ivanovich had dialed the telephone number.

"Hello, Stepan Spiridonovich? Hello! The whole collective wants to know how you are feeling. What? Still not very well? You will have to lie around for a couple more weeks? Y-yes ... We have decided to come visit you, Stepan Spiridonovich! Whom do you wish to assign to carry out this measure? What? ... What did you say? Yes, I understand ... Goodbye, Stepan Spiridonovich!"

Nikolay Ivanovich hung up the receiver.

"Well, what did he say?" we all asked in unison.



"He said we should send the person who has the least work to do. You see, it was an important conversation ... It turns out that we are supposed to go to him and admit that we are not doing anything."

Nikolay Ivanovich quickly took a report out of the cabinet and delved into it, noting: "I do not know about you, comrades, but I have a report that will not wait."

They glanced over at me. Mariya Ivanovna and Larisa Petrovna went over to the adding machines and Tonechka Kovaleva sat down at the typewriter. I put my chess problem to the side and began to solve production problems.

At this point Petya Kisochnik came into the room. Even when Stepan Spiridonovich was there, Petya was usually late for work, and now he did not usually arrive before lunch. We looked at him.

"You see, Peten'ka," Nikolay Ivanovich began cautiously. "We have consulted and decided that you should take care of our common obligation and visit Stepan Spiridonovich ... And he himself expressed the desire to have you be the one to come and see him."

Petya smiled slightly, but shrugged his shoulders and said:

"If I have to I have to; if he is expecting me, I will go ..."

"Go on Petya! Go, Kisochnik!" -- we encouraged him, and sighed with relief when the doors closed behind Petya.

The next day, naturally, we were not surprised when Kisochnik came to work earlier than the rest of us. Of course, Stepan Spiridonovich had given him a good tongue-lashing! But Larisa Petrovna was still interested:

"Well, Peten'ka, did you visit Stepan Spiridonovich?"

"I did," answered Kisochnik. "He told me that I had to make up the work I had missed in 3 days."

"Why such a hurry?" Mariya Ivanovna asked with tender sarcasm and winked at us with her left eye.

"Well, here is what happened," Kisochnik responded. "I arrived at the home of Stepan Spiridonovich... He thanked me, of course, and then asked: 'You, Comrade Kisochnik, are not very busy at work right now, are you?'"

"Well, what did you say?" asked Tonya Kovaleva.

"Well, what could I say? I answered him honestly, but not entirely."

"But what kind of answer is that!" Nikolay Ivanovich broke in. "Well, what did he say?"

"He said that he had a pass to the Crimea that was about to expire. He said that he was going to be ill for a couple more weeks, and that I, Kisochnik, was to go in his place. It is a good vacation hotel, a preferential pass, and I am not as busy as everyone else is right now. So 3 days from now I take off for the Crimea."

"That cannot be!" we exclaimed all at once.

"Yes it can," answered Kisochnik. And 3 days later he left for the Crimea.

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